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1981 AGRICULTURAL OUTLOOK

Papers Presented at the Agricultural Outlook
Conference Sponsored by the U.S. Department
of Agriculture—Held in Washington, D.C.,
November 17–20, 1980

PREPARED FOR THE

COMMITTEE ON AGRICULTURE, NUTRITION,
AND FORESTRY

UNITED STATES SENATE

JANUARY 1981

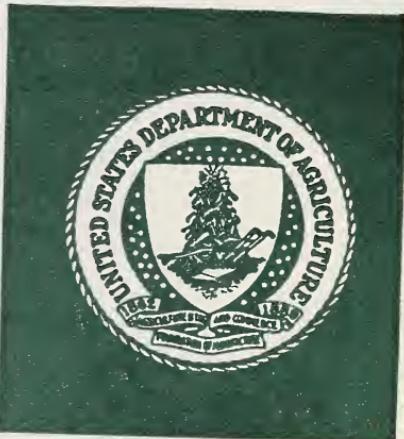


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WASHINGTON : 1981

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FOREWORD

The 1981 Agricultural Outlook Conference brought together over 1,100 people representing all segments of agriculture.

The November conference, which is sponsored by the U.S. Department of Agriculture, regularly is attended by representatives of various farm and consumer organizations as well as representatives from the transportation, farm implement, marketing, and other agricultural-related industries.

The annual outlook conference for many years has been an event where representatives of these various producing and consuming constituencies are able to gather—in one location—comprehensive, current information on what to expect during the coming year in the areas of production, prices, and demand.

The conference has become the Department of Agriculture's single most important forum for the release and exchange of outlook information on topics such as world and U.S. agricultural production and trade, general economic conditions, farm income and credit, the welfare of rural America, nutritional and dietary concerns, and policy issues.

As in the past, the 1981 conference featured departmental officials and leading analysts from outside the Federal Government who explored issues affecting the economic setting, trade and development, food and commodity programs, the agricultural research agenda, and resources and conservation.

Another issue of great importance this year was the direction U.S. farm and food policy may follow in the 1980's.

The basic law under which many of the current Federal farm programs operate will expire at the end of the 1981 crop year, and many of the issues discussed at the outlook conference are those that need to be addressed in any new legislation.

To provide members of the Senate Committee on Agriculture, Nutrition, and Forestry, the Senate, and the general public with timely and useful information on America's agriculture, the material presented at the 1981 Agricultural Outlook Conference is being published as a committee print.

The views and conclusions presented in this publication are those of the authors and do not necessarily represent the opinions of the committee or the U.S. Department of Agriculture.

HERMAN E. TALMADGE,
Chairman.

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CONFERENCE OPENING

(By Howard W. Hjort, Director of Economics, Policy Analysis and Budget,
U.S. Department of Agriculture)

Good afternoon ladies and gentlemen, it is my pleasure to welcome you to one of the most important events that the Department of Agriculture sponsors: The annual Agricultural Outlook Conference. While the conference is only one part of the vast array of USDA outlook and situation activities, it is in some respects the most visible.

This occasion provides me the opportunity to comment on the importance of this work to farmers, consumers, businessmen and women and Government officials, not only in the United States, but around the globe. Outlook and situation work ranks near the top of the list of the many functions performed by this Department.

All of us occasionally take for granted the timely and reliable information and forecasts which so importantly undergird the general United States and world economies, and especially the agricultural economies. Think for a moment of producers trying to decide what to produce without commodity intelligence to shape expectations. Think of banks and other commodity lenders trying to meet farmers' credit needs without information about prospective developments for agriculture. Imagine domestic and foreign buyers without information to shape ideas of what the best buys currently are and what the likely availability of supplies and price behavior will be over the next 6 or 9 months. Think of the problems associated with developing the basis for policy and program decisions without such information.

Yet as good as our information system may be, it isn't failsafe, as the remarkable events surrounding agriculture in 1980 indicate. When last year's outlook conference was held, there was no way anyone could predict all the political, natural and economic occurrences which so profoundly affected and continue to affect agricultural production, use and trade on a global scale.

Who could foresee a Soviet invasion of Afghanistan which prompted President Carter's suspension of grain sales to the U.S.S.R., or the extreme volatility in interest rates? Who could predict the vagaries of nature which prevailed over the past year, leading to below-normal crops in several countries, including the United States and the Soviet Union.

All of this leads to a remark Secretary Bergland has made which goes like this: "Outlook is the toughest game in town." Indeed it is. And the events of the past year show that no matter how far we go in outlook work, mankind and nature remain variables that are difficult if not impossible to predict.

Yet, we have a good system, operated by an exceptionally capable collection of public servants. And the strides we've made in recent

years in USDA's outlook work are important ones worth noting today. While we will never be able to predict every factor, our ability to assess the situation and present the outlook continues to improve. A year ago we were told to expect:

Stronger crop prices—for wheat, corn, and soybeans, the actual season average prices have been within the range predicted.

Adjustments in livestock production—1980 outlook conference estimates were very near to the outcome in production and prices.

Sharply higher input prices—this estimate fell somewhat below the actual rise in input costs.

A decline in net farm income—last year's forecast called for it to fall within the mid-\$20 billion range.

Record levels of farm exports, even exceeding \$38 billion—fiscal 1980 exports were about \$40.5 billion.

Food price increases to fall between 7 and 10 percent—1980's increase will be about 9 percent.

In no area—not even for specific commodities—were assessments far out-of-line with events since last November.

I'd also like to point out major accomplishments in the outlook arena that have happened over the past several years.

First, there was creation of the World Food and Agricultural Outlook and Situation Board in June 1977, which, as its name implies, coordinates and directs all commodity outlook and situation work within the Department. Making sure our international estimates are woven in with what is happening in U.S. agriculture and vice versa is about like keeping the right hand apprised of what the left one is doing.

Second, because of the vulnerability of crop production to weather shocks, the Joint Agricultural Weather Facility was created. It is run cooperatively between USDA and the Commerce Department's National Oceanic and Atmospheric Administration. The facility's primary function is to monitor world weather conditions and assess their impacts on crop and livestock production prospects. Its staff members link meteorological events in specific locations with agricultural activities. Obviously, their role is critical to modern outlook work.

A third accomplishment was establishment of the interagency lockup facility for forecasting global crop production and use, similar to that used for years by the domestic Crop Reporting Board. This process insures that all users of global crop information receive our estimates at the same time and after the commodity markets are closed. The security provided is essential to the mission, and an atmosphere of dedication reigns within those secure, lockup areas wherein several USDA agencies work together—and often argue together—all to produce the most accurate and timely departmental estimates of crop production and use.

This greater interaction between agencies—primarily the Foreign Agricultural Service's commodity analysts and the Economics and Statistics Service's country and regional specialists—is the fourth accomplishment I'd like to cite. We have tremendous talent in the varied disciplines of these organizations, and bringing them together as we now do, is a greater factor in the success of our outlook work.

Other important events include the establishment of an International Economics Division with regional branches in the Economics and Statistics Service, which was a major boost to global outlook work; creation of a Crop Condition Assessment Division in the Foreign Agricultural Service, which operates out of Houston and utilizes such sophisticated technology as satellite imagery and computer modeling as part of its assessment effort; and, last, the important step of upgrading our agricultural attachés to the counselor rank in our embassies around the world, giving them status and authority so richly deserved and warranted. This action helps insure that reporting on country and commodity developments receives the high priority it deserves.

I count myself fortunate and proud to have participated in furthering USDA's outlook effort through these various changes.

Now we look ahead. Factors which will shape the agricultural and food outlook in 1981 are many, but there are certain specific issues which will have great impact: Economic growth; price inflation; world demand for food and fiber; weather and how it favors or disfavors the 1981 crops; adjustments in the livestock herds; and policy changes, primarily in the form of the 1981 food and farm legislation and other key issues such as the direction the United States will now follow in trade with the Soviet Union and other customers of U.S. farm products.

These are big issues. We will look at each of them and many others throughout this week's conference. As usual, excellent sessions are planned on human nutrition, family living and rural development along with careful examination of all the commodities. The conference will conclude with sessions Wednesday afternoon and Thursday on policy for the 1980's. I strongly recommend these to each of you.

In conclusion, I am pleased once again to welcome you to USDA's annual Agricultural Outlook Conference. Outlook 1981 is our 57th edition.

It promises to be an exciting week. I'm glad you're here. Thank you.

**OUTLOOK FOR FARM AND FOOD
POLICY IN THE UNITED STATES**

THE ECONOMIC OUTLOOK FOR 1981

(By Stephen M. Goldfeld, member, Council of Economic Advisers)

My charge today is to provide some background for a general review of the agricultural outlook by presenting an overview of the prospects for the U.S. economy in 1981. These days in view of the litany of letters used to describe the likely path of the economy—the conventional V-shaped recession recovery, the lazy L, the reverse J and the infamous double-dip W—most forecasts tend to be alphabetic. I will try and be somewhat more informative. However, given that the administration is not scheduled to release an official quantitative forecast until this coming January, I will primarily present a qualitative assessment of the outlook.

Although the focus of my presentation is on the outlook for 1981, it will help put things in perspective if we first review the major developments thus far this year.

The year 1980 started with policymakers being strongly concerned with containing the effects of the 1979 oil shock and preventing this shock from setting off a double digit inflationary wage and price spiral. That this concern was warranted was evidenced by the sharp jump in the rate of inflation in the first 3 months of the year when increases in both the consumer and producer price indexes spurted into the 18-20 percent range. At the same time wages, which had recorded relatively modest increases during most of 1979—running at about 8½ percent in the face of an inflation rate of over 13 percent—began to accelerate. Inflationary expectations worsened and interest rates skyrocketed. The reaction of some consumers was to buy ahead, but this only added fuel to the fire.

In response to these developments the administration and the Federal Reserve took a number of actions including the imposition of selective credit controls. Collectively, these actions served to contain the inflationary spiral and inflation came down sharply. Interest rates plummeted: The prime rate dropped from 20 percent to 11 percent while the Treasury bill rate fell from a peak of near 16 percent to just over 6 percent.

At the same time, the economy entered a recession. The unemployment rate which had been in the neighborhood of 6 percent through March, jumped over the short space of 2 months to the 7¾-percent level. With weakness concentrated in autos and housing, real GNP in the second quarter fell at a record 9½ percent annual rate.

Around the middle of the year most forecasts—including our own—were projecting another substantial real GNP decline in the third quarter, to be followed by a further decline in the fourth quarter. And most private forecasters had the unemployment rate rising to the 8¾- to 9-percent range by yearend. Once again, as it had

done in 1979, the economy proved more resilient than observers gave it credit.

As the summer unfolded, various signs of recovery began appearing. After a number of months of decline, there was a pickup in housing starts and retail sales in June, in auto sales in July, and in employment and industrial production in August. For the third quarter as a whole, real GNP advanced at a 1 percent annual rate—hardly a buoyant recovery but a far cry from the 4- to 5-percent decline forecast at the start of the quarter. Indeed, in recent weeks, many observers have suggested that the current recession has run its course. If hindsight validates this view, the 1980 recession will prove to be the briefest on record—a fact which has prompted one pundit to comment that if the recession were any shorter, the game warden would make us throw it back.

The relative brevity of the recession is due to a variety of factors. A few of these deserve emphasis because they have direct implications for the 1981 outlook. One factor in making the recession brief is the apparent absence of a sharp inventory cycle. Although inventory-sales ratios are relatively high, the absolute levels of stocks in many industries are reported to be at operating minimums and there are few reports of business perceptions of heavy inventories. This state of affairs reflects heightened business caution over inventory policy in the last year and one-half or so. Some have suggested that this caution in turn stems from that fact that forecasters started proclaiming a recession well back in 1979. Whatever the reason, the absence of a sharp inventory cycle will tend to moderate growth in coming quarters, contributing to a recovery which will be more modest than those typically achieved following a recession.

A second factor which contributed to the brevity of the recession was the rapidity with which interest rates fell from their peaks of early spring. This unquestionably was instrumental in the prompt turnaround in housing and helped autos as well. A major reason for the rapid movements in interest rates was the adoption of a new set of operating procedures by the Federal Reserve. More particularly, throughout 1980 the Fed has pursued a reserves-oriented strategy aimed at achieving better control over the growth of the monetary aggregates. As a consequence, as compared with previous years, in 1980 the Fed was willing to witness substantially greater fluctuations in interest rates. As recent events have indicated however, this new strategy has led to financial conditions which are historically unusual for the early stages of recovery. I am, of course, referring to the run up in interest rates which has seen short rates rise some 700 basis points from their June lows and long rates up some 300 basis points. This unprecedented pattern suggests a second reason for a sluggish recovery and I shall return below to the question of monetary policy.

Aside from causes of the recession's brevity, there is also one alleged consequence of that brevity which deserves comment. In particular, one often hears these days that the recession was too short—or put another way that the patient stopped taking its anti-inflationary medicine before the medicine had a chance to work. I believe this view is based on a misreading of both recent events and of history. First of all

as noted earlier, in comparison to "what might have been," the intertwined effects of economic policy and the recession did serve to break the potentially dangerous inflationary spiral of early 1980. Second, the record of past recessions does not suggest that recessionary medicine has been a particularly effective treatment for the Nation's underlying inflation ills.

A sense of this can be gleaned from the chart* which plots the actual and the "underlying" or the "core" inflation rates over three inflationary episodes. The first of these—the Vietnam episode—saw excess demand drive up the underlying rate, but the 1970-71 recession did little to moderate it. The second episode involving a worldwide crop shortage and the first oil shock lifted the underlying rate further. Despite the 1974-75 recession—the deepest in 40 years—the underlying rate of inflation again proved stubbornly sticky. With the 1979 oil shock we experienced a further ratchet upward and once again the ensuing recession appears to have made little dent in the underlying rate.

All of this suggests that the recessionary medicine may be an overrated cure of inflation. However, this discussion is meant neither to indicate a sanguine or fatalistic attitude toward the inflationary process nor to deny the basic proposition that we are coming out of the 1980 recession with an unacceptably high rate of inflation. Furthermore, as elaborated below it is this rate of inflation, when coupled with Federal Reserve determination in the pursuit of monetary aggregates, that may well dictate the nature of the recovery.

As already suggested, when all is said and done, both the recession and the recovery from the recession are likely to be regarded as historical freaks: The recession itself being both unusually brief and unusually sharp; the recovery being unprecedently sluggish. In the previous six postwar recessions, the pace of economic activity during the early stages of a recovery has been quite brisk. For example, for the four quarters after the trough of a recession, real GNP has typically advanced by $7\frac{1}{2}$ percent. Most recent private forecasts suggest that this time around the corresponding growth of real GNP is likely to be in the $2\frac{1}{2}$ - to 3-percent range. While we have already suggested some of the reasons for this, we turn now to a more detailed analysis of the outlook.

Consumer spending over the course of 1981 is likely to be considerably less buoyant than in a typical recovery. To a large extent this reflects the effect of fiscal and oil drag on consumer incomes. Among other things, the sources of drag include the following: A scheduled social security tax increase; inflation-induced tax bracket creep; and an increase of windfall profits tax revenues as world oil prices increase and as the decontrol program permits larger quantities of all to be sold at world market prices. Higher food prices are also likely to serve as an additional source of drag on consumer incomes. Another factor in the consumer picture is that the personal saving rate is currently reported to be quite low by historical standards. This would suggest there is little room for a burst of consumer spending fueled by a substantial decline in the saving rate. Such a decline was a factor in the early stages

*See p. 12.

of the recovery from the 1974-75 recession. On balance, the consumer is likely to be faced with a number of factors contributing to a sluggish growth in disposable income and is not likely to be a major source of independent strength in the recovery.

In the investment sector, we have already noted that the likely absence of a major inventory cycle will tend to contribute to a moderation of the recovery. Business capital spending is also unlikely to be a major source of strength in the near term. As is typical during a recession, business spending plans during 1980 have been scaled down several times. In the face of low capacity utilization rates and depressed profits, despite the advent of a recovery, real business investment in plant and equipment is unlikely to change much in the near term. However, if, as seems likely the prospective tax action provides a significant investment stimulus, capital spending is likely to pick up at the end of 1981 and on into 1982.

The remaining component of investment—residential construction—is something of a question mark. Most private forecasters are currently projecting housing starts in the fourth quarter of 1981 in the 1.6 to 1.7 million unit range. Given the rapid recovery of housing starts from the May low of 900,000 units to the September level of over 1.5 million units, and given strongly favorable demographic factors, these housing start projections seem quite reasonable. They would, of course, imply that residential construction would be a major source of gains in real GNP over the next several quarters. The major uncertainty with this view is the likely impact of financial conditions on the housing market. The recent runup in interest rates has spawned anecdotal evidence of problems in mortgage markets but it is too early to tell for sure whether significant problems are likely to arise.

Of the remaining components of aggregate demand neither State and local spending nor net exports is likely to be much of an engine for growth. On balance, then, it seems fairly clear that the prospects are for a quite modest economic recovery over the course of 1981. The pattern of activity is likely to be a bit sluggish in the first few quarters of the year and to pick up after midyear. Indeed, at the end of the year the economy should be moving at a more healthy clip and this should make for a somewhat improved situation as we enter 1982.

We turn now to the outlook for inflation. In recent years considerable attention has been focused on the notion of the underlying rate of inflation. Indeed, one version of this concept—based on a relatively sophisticated model—was pictured in figure I. There are, of course, other simpler ways roughly to gage the underlying rate. For such purposes one might look at standard unit labor costs or various deflators excluding food and energy. Taken as a whole, these various measures suggest that inflation currently shows an underlying momentum of about 9 percent. The actual inflation rate obviously varies a good deal more than the underlying rate—again witness figure I—although this behavior is considerably more marked for the CPI than it is for the GNP implicit deflator. Nevertheless, at least for the deflator, an inflation performance roughly in line with the underlying rate seems a reasonable bet. For the longer term, however, ways must be found to reduce the underlying rate from its current unacceptably high level. This brings me to my final points—concerning fiscal and monetary policy.

The outlook for the economy obviously depends critically on the precise stance of monetary and fiscal policy. As is by now well established, the Federal Reserve has embarked on a policy which is motivated by a longer term concern with bringing down inflation. As previously noted, under its new operating procedures, the Fed has shifted to a regime which emphasizes achieving targets for the monetary aggregates. For 1981 the target range for M-1B is $3\frac{1}{2}$ to 6 percent—before special adjustment for NOW accounts. When this target was first unveiled, the Fed and others emphasized the potential problem of the consistency of the targets with a nominal GNP forecast of the sort I described above. Achieving both forecast and targets clearly requires a substantial increase in monetary velocity. This in turn is usually associated with a rise in interest rates or, as in the recovery from the 1974–75 recession, a fortuitous shift in the behavior of the public's demand for money. Absent the latter, the question is simply whether or not the rise in interest rates necessary to elicit the needed increase in velocity is consistent with the underlying forecast.

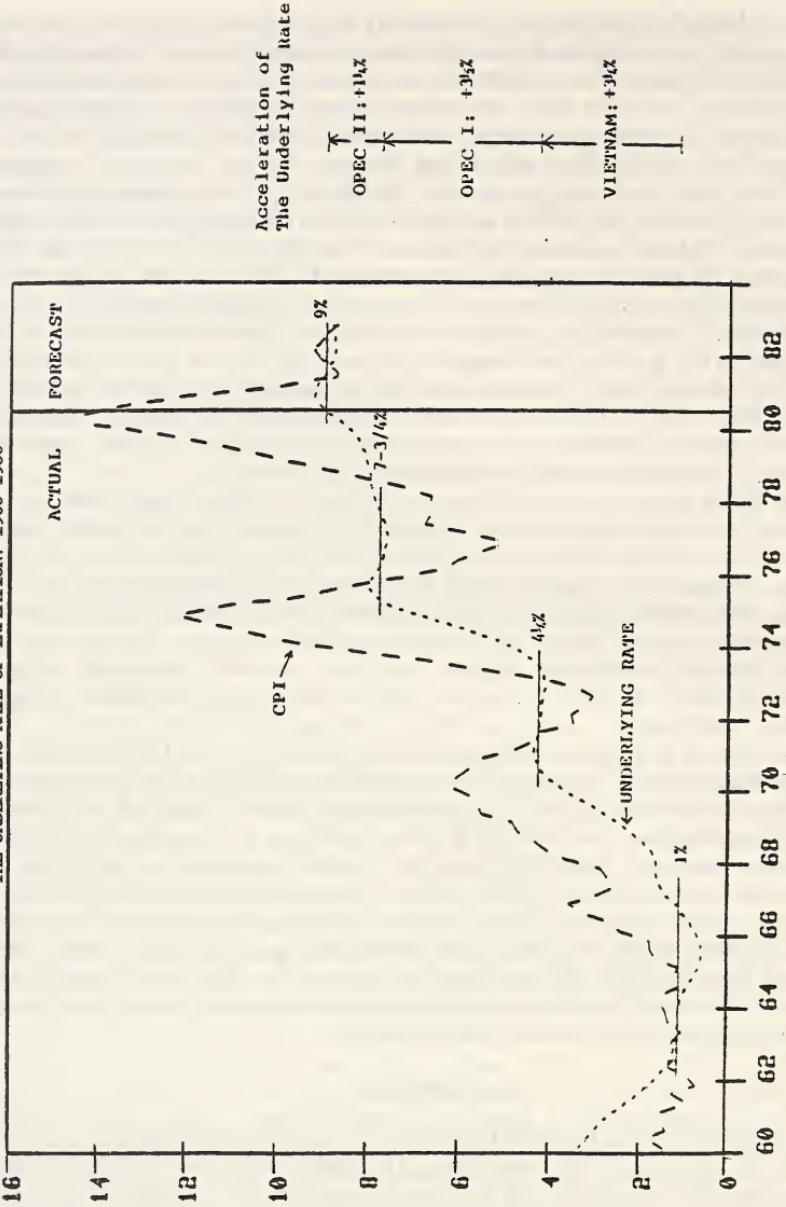
Since these concerns were first expressed in midsummer, the economy has proved stronger than originally forecast. As a result, over the last few months we may well have had a premature taste of the collision between the targets and the recovery. Further gyrations in interest rates were evident in the last few weeks. On the whole, from the present vantage point it is not clear how serious the potential conflict between monetary targets and the recovery is likely to be. Without doubt, however, it is one of the important elements of uncertainty in outlook.

As for fiscal policy in 1981, as already hinted at, in the absence of any tax changes the ratio of tax receipts to GNP is likely to rise—somewhere between $1\frac{1}{4}$ and $1\frac{1}{2}$ percentage points. Coupled with current administration restraint in Federal outlays, in the absence of any new policy actions the 1981 budget would represent a significant tightening in fiscal policy. Of course, congressional action will undoubtedly reduce taxes in 1981. Nevertheless, an appropriately sized tax cut is likely to be such as to moderate only partially the restrictive stance of fiscal policy. This result is dictated by the concern with inflation and the need to avoid putting excessive pressure on capital markets in the light of current monetary policy.

CONCLUSIONS

The recovery from the 1980 recession is likely to proceed at a modest pace in 1981. At the same time, the inflation rate is likely to remain uncomfortably high. It is important that policymakers address this latter issue and the related one of lagging productivity growth. While the causes of the productivity slowdown have yet to be fully sorted out, it seems clear that at least part of the explanation must lie in the reduced rate of business capital spending during the 1970's. The policy punchline from this would seem to be that a substantial fraction of the tax cut likely to be enacted next year should be devoted to stimulating investment. This would allow us to assist the recovery while at the same time beginning to address some of our longer term problems.

THE UNDERLYING RATE OF INFLATION: 1960-1980



SOURCE: Data Resources, Inc.
 The "Underlying Rate" used here is DRI's "Core Rate"
 The Forecast is from DRI, "Control 072480".

A CHALLENGE FOR THE EIGHTIES: INCREASE GRAIN PRODUCTION

(By Bruce A. Scherr, Vice President, Planning Economics Group, Boston, Inc., Boston, Mass.)

The central issue facing the 1980-81 agricultural economic outlook is the supply/utilization for corn. In very blunt terms, at today's cash prices of \$3.50 to \$3.60 per bushel for corn, the projected carryout on September 30, 1981, could be as low as 400 million bushels (approximately 5 percent of total use).¹ The 1980-81 projections for corn use in table 1, under alternative A, exhibit demands which in essence are unchanged from 1979-80.

TABLE 1.—SUPPLY/UTILIZATION BALANCE SHEET FOR CORN

	Crop year (million bushels)				
	1978-79	1979-80	1980-81(A)	1980-81(B)	USDA 1980-81 ¹
Beginning stocks.....	1,104	1,286	1,597	1,597	1,597
Production.....	7,082	7,764	6,467	6,461	6,467 (± 220)
Total supply.....	8,186	9,050	8,064	8,058	8,064 (± 220)
Feed use.....	4,202	4,497	4,360	4,100	4,200 (± 300)
Exports.....	2,122	2,432	2,580	2,580	2,550 (± 200)
Other use.....	576	624	724	724	715
Total use.....	6,900	7,453	7,664	7,404	7,465 (± 450)
Carryout, Sept. 30.....	1,286	1,597	400	654	600 ($+200$ to -100)

¹ Source: "Feed Situation," October 1980.

TABLE 2.—ANIMAL FEEDING IMPLICATIONS

	Crop year (million bushels)			
	1978-79	1979-80	1980-81(A)	1980-81(B)
Corn.....	4,202	4,433	4,360	4,100
Oats.....	534	462	445	445
Barley.....	214	201	185	185
Milo.....	585	526	426	426
Wheat.....	40	105	110	225
Total (million tons).....	148.9	154.2	149.0	145.0
Grain consuming animal units (millions).....	473.9	482.4	468.4	468.4
Feeding rate/animal unit.....	0.314	0.320	0.318	0.309

ANIMAL FEEDING IMPLICATIONS

The reduced use of corn for feed in 1980-81 to a level of 4,100 million bushels would require a significant increase in the use of

¹ In the 1975-76 crop year the ending stock to total disappearance ratio was 6.8 percent. A 5-percent ratio would represent a record low available crop supply.

wheat for feeding. In 1979-80 wheat used for feeding was 105 million bushels, whereas, the alternative B projections in tables 1 and 2 indicate a conservative increase in wheat feeding of 120 million bushels to a level of 225 million bushels.

Other feed crops will offer little additional assistance in meeting total domestic feeding demands, since poor domestic production in 1980 has limited these supplies. Briefly, sorghum and barley stocks are declining to critically low levels in parallel with available corn supplies. Based on the USDA's October estimates in the "feed situation," sorghum and barley stocks as a percent of use are only several percentage points higher than the record lows of 1974-75. At today's prices it is likely that new lows would be reached for stocks as a percentage of use, if demands are not reduced even more. The projected feed usage for 1980-81 is based on an expected reduction in grain consuming animal units of about 3 percent and a reduced feeding rate of 0.309 tons per unit compared to 0.320 tons per unit in 1979-80.

PLANTING IMPLICATIONS FOR 1981

The plantings outlook can be characterized as a situation in which there just is not enough acreage available to increase production sufficiently in 1981. The figures in table 3, "Acres Planted Worksheet" indicate possible acreage shifts that could result in 1981. Winter wheat plantings are nearly complete and early indications from producers suggest a very large increase of 5 million additional acres planted for the 1981 harvest (table 3). The very large winter wheat plantings are a good indication that Southern producers will probably increase the amount of land they double-crop between winter wheat and soybeans. Recent experience suggests that about 9 percent of the soybean plantings in the last 5 years was double-cropped. This percentage will probably be more on the order of 11 percent in 1981.

TABLE 3.—ACRES PLANTED WORKSHEET

[In million acres]

	1979	1980	1981	Change in 1981
Corn	80.0	83.5	88.5	+5
Soybeans	71.6	70.3	65.3	-5
Winter wheat	51.9	58.0	63.0	+5
Cotton	14.0	14.3	15.3	+1
Subtotal	217.5	226.1	232.1	+6
Grain sorghum	15.4	15.8	15.8	-----
Oats	14.1	13.2	12.2	-1
Barley	8.1	8.3	9.3	+1
Rye	3.1	2.6	2.6	-----
All spring wheat	19.6	23.0	21.0	-2
Hay	61.2	59.9	59.9	-----
Rice	3.0	3.4	3.4	-----
Sunflowers	5.6	4.0	4.0	-----
Other	17.6	7.7	7.7	-----
Government	11.8			
Subtotal	149.5	137.9	135.9	-2
Total	367.0	364.0	368.0	+4

¹ Denotes lowest acreage from 1969 through 1980.

² The increased total acreage is attributed to 3,000,000 acres of new land and additional acres of double-cropped soybeans.

The major concern is the required shift of significant acreage to corn in 1981. If corn demands are to slow down, prices for corn must increase by 15 to 20 percent through the next 3 to 5 months. Assuming continued strength in soybean prices, a ratio of about 2.1 to 2.2—soybean price to corn price—will be required to shift significant acreage to corn. Assuming further that prices respond to favor corn, conceivably 1981 corn plantings would be increased by 5 million acres to 88.5 million (table 3).

Given the two key components to the acreage formula—5 million acres more devoted to each corn and winter wheat—the acreage “juggling act” begins. Other feed grain acreage will probably not dip below the already drastically low levels of 1980. It might be the case that barley and oats trade 1 million acres between them, but total barley, oat, and sorghum acreage is assumed to be the same as in 1980. Given the supply/utilization situation for cotton in the United States, it is most probable that cotton plantings would be increased by at least 1 million acres in 1981. This brings us to pose the question of where will the additional 10 million acres come from to meet the increases for corn and winter wheat?

There are three major acreage sources to consider:

- (1) Spring wheat acreage would have to be reduced by a minimum of 2 million acres,
- (2) New acreage must be brought into production at a level of about 3 million acres, and
- (3) Soybean plantings would have to decline by 5 million acres with this reduction constrained by about an 11-percent double-cropping in the South.

Table 3 was purposely titled an “Acreage Planted Worksheet,” since these acreage projections for 1981 are not intended to be surveyed intentions or forecast levels of next year’s plantings. Rather, the table was developed to highlight the very serious problem facing U.S. agriculture and the world economy. Worldwide demands for U.S. grains and oilseeds have reached a level such that one poor production year—and this terminology has taken on a new meaning in the last 5 years—puts the world agriculture supply/utilization situation in a highly vulnerable position. A U.S. corn yield of 91 bushels per acre harvested in 1980 was only surpassed three other times during the 1970’s; yet, placed into perspective today, this yield could potentially result in the most significant corn shortage in our history. Table 3 is the exhibition of an attempt to give-and-take between major crops, in terms of acreage, to result in a somewhat minimum balance of supply and demand for major crops over the next 2 crop years.

LOOKING AHEAD TO 1981-82

The supply/utilization and plantings scenario presented above implies very strong 1981 crop prices. Even assuming good weather for the 1981 growing season, all major crops would remain in tight supply, vulnerable to any production-related problems. We will enter 1981 with considerably higher crop prices, relative to today’s levels, and new crop uncertainties through the first 6 months of 1981 will provide persistent support to major crop prices. There is always a chance that

unpredictable shocks may exacerbate a strong price situation, but there is little constructive purpose to such projections.

The message is already quite clear, supplies of major grains and oilseeds in the United States and world are extremely tight relative to demands. The basic forces which will influence these prices through much of the current crop year are already in place.

The users of feed grain, food grain, and oilseed supplies are now in the process of drawing down a limited available supply; as a result prices must advance sharply from today's levels to slow the rate of use and provide the underpinnings for required acreage adjustments in 1981 (table 4).

The obvious way out of the very tight supply situation that has developed in the last year is to achieve extraordinary crop yields in 1981. It is not that such a scenario should be dismissed out-of-hand, but rather that we should not fully expect such an event at this time. A corn yield of 105 to 110 bushels per acre would add 380 to 760 million bushels to corn production in 1981. Given corn plantings of 88.5 million acres, a yield of this magnitude would ease the tight supply scenario. Therefore, the situation is not hopelessly difficult, in terms of the worldwide consumer of grains, but still highly sensitive to any production shortfalls.

TABLE 4.—IMPLIED 1981-82 BALANCE SHEETS FOR SELECTED CROPS

[In millions of bushels, except cotton in million 480-lb bales]

	Crop year 1981-82			
	Corn	Soybeans	Cotton	Wheat
Beginning stocks.....	660	179	2.1	845
Production.....	7,700	1,929	15.0	2,467
Total supply.....	8,360	2,108	17.2	3,312
Total use.....	7,700	1,950	13.5	2,500
Carryout.....	660	158	3.7	812
Carryout/use $\times 100$	8.6	7.4	27.4	32.5
Yield (bushels per acre).....	100	30	500	33
Yield (pounds per acre).....				

OUTLOOK FOR RURAL DEVELOPMENT

(By Alex P. Mercure, Under Secretary for Rural Development, U.S. Department of Agriculture)

The past decade has been one in which Americans collectively have taken a fresh look at the virtues of countryside, smaller towns and smaller cities as places to live. People have opted in increasing numbers for life in the nonmetropolitan or purely rural environment.

According to the best tracking of population trends that can be had between actual decennial census counts, nonmetropolitan population—that is, in places of less than 50,000 and the open country—has been growing at an annual rate of about 1.3 percent.

That is about 40 percent greater than the estimated rate of population growth in metropolitan areas.

There are estimated to be about 220 million people in this country. About 60 million of them live in the nonmetropolitan areas. It will be a few more months before we have firm returns from the census of 1980, giving us confirmation or correction of those estimates.

But we know that rural America is the cradle of dynamic forces, both economic and social, now working in this country.

It is the seat of agriculture.

It is where most of the Nation's new development in sources of energy will take place, as well as massive undertakings for protection of the natural environment.

It invites industry.

It is the natural and inevitable direction of growth.

Major cities of the United States reached a point of saturation and diminishing returns in their domination of national growth through the 1960's. They paid a heavy price for random, runaway growth and for neglect of needs in rural areas to the point that rural areas could not support their people. Cities today are still wrestling with the consequences; sorting themselves out, reorganizing and rebuilding, laboring to take care of the people they have and not clamoring for more.

The shift toward rural development is a phenomenon to be welcomed but, it also raises warning signals. It raises the priority for making up shortcomings in the capacity of rural areas to provide adequate support, in terms of community services, employment opportunity, and living amenities that are considered essential to the American standard of life.

Rural areas containing about 2 million people are still without modernized, central water supply systems.

Nonmetropolitan areas have as much deficient housing as the twice as populous metropolitan sector of this country, and nearly 60 percent fewer doctors. Public transportation is so poorly developed in rural

areas that 99 percent of the rural employed use private transportation to get to work. Nearly half of the elderly people in rural areas are stranded with neither public nor their own means of private transportation.

Demand for employment opportunity in the nonmetropolitan sector is also on the rise. Within recent memory, rural unemployment rates ran consistently lower than the rates in metropolitan areas. But in four of the seven most recent quarters, the rural rate was highest. For the most recent quarter, ending last September, rates in both sectors were the same at 7½ percent.

Agriculture commands a dominant position in every assessment of the rural economy and every projection of its future. Of the estimated 2.8 million farms in the United States, 1.2 million are rated as "small" farms. By definition, small farms are those on which members of a single family provide most of the labor and management and derive at least a significant part (if not all or most) of their income from the farming operation. Another point of classification is that the net income of a small-farm family is below the median nonmetropolitan income of the State. (In 1980, the national nonmetropolitan median income was \$17,800 a year.) The average age of small farmers is 53, and the average proportion of income earned by small-farm families at jobs off the farm is 75 percent. But these families control about 30 percent of total farm assets in the United States and account for more than one quarter of total farm sales.

Thus it is seen that the strengthening of small-farm agriculture is an essential goal as it affects competition for employment, elevation of living standards, and productive capacity of this Nation's great food and fiber industry.

These elements of need in the rural United States were treated vaguely throughout the 1960's and until the latter 1970's.

But within the past year, the administration of President Jimmy Carter has accomplished what may prove to be one of its most salutary and enduring works in creating a system for a large-scale, nationwide rural development program that can function consistently and effectively over the long term. It is a system through which Federal resources, which supplement local and regional resources, can be coordinated with initiatives of States and local communities to meet realistic objectives.

We have evolved a clear plan to bring Federal resources to areas that need them most, and—as the President has expressed it—to "encourage and support the resources and resourcefulness of rural America, and be the partner of its local leaders."

This plan and structure emerges from the small community and rural development policy established by the President last December. It embraces objectives that have been confirmed by strong bipartisan actions in the Congress, in the States, and by successive administrations of both major parties. We hope it will be carried forward.

Looking ahead to 1981, rural communities and their leaders see in being for the first time a channel reaching from White House to town and countryside through which local needs and initiatives can secure necessary Federal attention and support.

The mechanism is topped by a Cabinet-level working group, co-chaired by the Presidential Assistant for Intergovernmental Affairs and the Under Secretary of Agriculture for Rural Development. In the latter capacity, I represent the Department of Agriculture, which carries a mandate conferred by Congress to function as the department of primary responsibility for mustering Federal support to development efforts in rural areas.

Federal liaison with State Governors and their councils or agencies will be maintained through rural development task forces of the 10 Federal regional councils. In most cases, these task forces are chaired by the multistate area directors of the Farmers Home Administration. This USDA credit agency administers some 40 percent of Federal business-industrial development that undergird the rural effort.

Within the States FmHA and other Federal agency field officials will maintain close relationship with local development bodies and will share with them the leveraging of Federal program funds to generate high quality development programs and projects.

Rural development has come a long way to reach the point of advancement where we find it today. The 1980's are a decade rich in opportunity for new directions and fuller lives for rural and smalltown residents.

But before population growth can add significantly to the tax base and other sources of economic growth it often puts local governments into tight financial predicaments. A host of needs for housing and other facilities for accommodating more people usually require urgent attention.

Early in this administration, in the rural development sector of the Department of Agriculture, we agreed on five major rural development goals. They were:

1. Improve rural income and increase rural employment opportunities.
2. Improve the access of rural residents to adequate housing and essential community facilities and services.
3. Target our efforts to the most distressed, disadvantaged, isolated areas, communities and people.
4. Involve the private sector as well as the various local, State, and Federal agencies in establishing rural priorities and programs.
5. Strengthen the planning, management and decisionmaking capacity of public and private institutions concerned with economic opportunity and quality of life in rural America.

All these principles are incorporated into the Small Community and Rural Development Policy. Those five goals embrace needs that all leaders of rural America know the Nation must meet.

We need to get on with the task of building strength and quality into rural America, wherever it is changing or wherever there is need for revival. However, we must guard against thoughtless drift into random spurts of building that would misuse the land, desecrate the environment, or repeat in rural America the grave mistakes that were made during runaway buildup that led to disaster in so many of our cities.

We need to preserve and enhance the wholesomeness that has always enhanced life in rural areas. We must make it possible for every rural

community to offer its people a means of livelihood, modern housing, community facilities and other amenities that measure up to recognized American standards of living.

We have begun to make tangible progress, but we have only begun. There is much farther to go if we are to solve the deepest problems of rural areas, and master new problems that will rise as a result of rural growth.

We have the tools and a wide variety of necessary resources. Let us hope that the effort will be sustained to the best of its potential.

1981 FOOD PRICE OUTLOOK

(By Paul C. Westcott, Economics and Statistics Service,
U.S. Department of Agriculture)

Inflation is an important economic problem facing the Nation. Food prices are one of the most visible aspects of inflation. Two reasons are often cited for this. First, food is a basic necessity making expenditures on food a required living cost. Second, because of its perishability, food is purchased frequently by consumers, usually more than once a week.

Until the middle of the year food prices in 1980 rose relatively slowly—about half as fast as prices in the rest of the economy. Farm level prices of foods rose only slightly in the first half of 1980, primarily reflecting declining livestock prices. In the second half of 1980 food prices have risen more rapidly as prices received by farmers recovered from relatively low levels.

In 1981 food prices are expected to rise substantially through mid-year. As in the last half of 1980, the farm value component of food prices will continue to be a major source of rising retail prices. Food marketing costs and raw sugar prices will also be important.

My remarks today will focus on the major cause of rising food prices, how these factors have affected food prices in 1980, and how they are expected to influence food costs in 1981. First, I will discuss the use of the Consumer Price Index as a measure of retail prices and the importance of food prices in determining that index. A discussion of the major components of retail food prices will follow. This will be followed by a review of food price developments in 1980 and the outlook for food prices in 1981.

RETAIL FOOD PRICES AND THE CONSUMER PRICE INDEX

The most commonly used and closely watched indicator of retail price movements in the economy is the Consumer Price Index for all urban consumers (CPI-U). Compiled monthly by the Bureau of Labor Statistics (BLS), retail prices are surveyed nationwide for a fixed basket of consumer goods and services. Indexes representing these prices are reported, and weighted aggregates are computed for major goods and services categories.

TABLE 1.—*Relative importance of major consumer price index categories*

CPI category :	December 1979
All items	100.0
Housing	45.0
Transportation	18.6
Food	17.7
Food at home	12.2
Food away from home	5.5
Apparel and upkeep	5.1
Medical care	4.8
Entertainment	3.7
Other goods and services	4.1

Source: Department of Labor, Bureau of Labor Statistics.

The CPI-U is a price index. However, because the survey covers a fixed market basket, the CPI-U is not a cost-of-living index. A 10-percent rise in the CPI-U for food does not necessarily mean that consumers spend 10 percent more for food. Consumers adjust their purchases in response to changing relative prices. This is especially important for foods where a great deal of substitution takes place. For example, when beef prices rose rapidly in 1978 and 1979, consumers purchased more pork and poultry, whose prices rose relatively less. The CPI-U does not take such consumption adjustments into account, and therefore tends to overstate changes in the cost of living.

In December 1979, the relative importance of food in the CPI-U was 17.7 percent (see table 1). This means that almost one-fifth of the retail basket of goods and services is represented by food prices. Food is the third most important category in the CPI-U behind housing (45 percent) and transportation (18.6 percent).

Prices for food at home account for 69 percent of the food CPI-U, with the remaining 31 percent being accounted for by prices for food away from home. In the food at home CPI-U (see table 2), meat is the most important category (26 percent), followed by fruits and vegetables (13.9 percent), dairy products (13.5 percent), and cereals and bakery products (12.4 percent).

TABLE 2.—*Relative importance of major grocery store food items*

CPI category :		Relative importance, December 1979
Food at home		100.0
Meats		26.0
Beef and veal		14.8
Pork		6.8
Other meats		4.4
Poultry		3.2
Fish and seafood		3.2
Eggs		1.9
Dairy products		13.5
Fats and oils		2.8
Fruits and vegetables		13.9
Sugar and sweets		3.4
Cereals and bakery products		12.4
Nonalcoholic beverages		11.3
Other prepared foods		8.3

Source : Department of Labor, Bureau of Labor Statistics.

MAJOR FOOD PRICE COMPONENTS

The retail food dollar can be viewed as being comprised of three major components. Following the U.S. Department of Agriculture's (USDA) market basket concepts, prices for domestically produced farm foods consist of (1) a farm value, measuring the return or payment received by farmers for agricultural commodities used in food, and (2) a farm retail price spread, measuring the impact of marketing costs on food prices. The third component of food prices covers the costs of foods not produced on domestic farms and includes fish and imported foods.

All food price changes can be traced to changes in these three components. For example, the annual average retail food price increase for 1980 will be near 9 percent, the smallest increase since 1977. The

farm value of foods will average about 6 percent above 1979 levels and account for about one-fifth of the food price rise. The farm to retail price spread will rise near 9 percent this year, accounting for about half of this increase. The remaining part of the food price increase can be attributed to prices for fish and imported foods which will average about 12 percent higher than last year.

FARM VALUE OF FOODS

Large production and adequate stocks of many farm food commodities kept agricultural commodity prices low in the first half of the year, leading to the relatively small 6 percent farm value increase for 1980. The farm value of foods played fundamentally different roles in food price inflation in the first and second halves of the year. In the first half of the year, large hog slaughter led to record supplies of meats and poultry. Mild winter weather led to a record citrus crop. At the same time, real consumer incomes were falling as the economy entered a recession, and demand for more expensive foods slackened. As a result, the farm value of foods rose very slowly in the first half of 1980 and was the major moderating factor in determining food prices.

In the second half of the year, the farm value contributed much more to food price rises than in the first half. A sharp rise in the farm value of foods from the low second quarter level caused most of the third quarter food price increase. Livestock prices rose substantially reflecting planned production cutbacks, seasonal marketing patterns, and adverse weather conditions. Prices for fresh fruits and vegetables rose seasonally. The farm value of fats and oils also rose sharply as reduced production of oilseeds this year led to rising commodity prices. In the fourth quarter, although the farm value of foods will continue to climb, it will likely increase less rapidly than in the third quarter as production of many agricultural products will increase seasonally.

FARM TO RETAIL PRICE SPREAD

The farm to retail price spread represents about two-thirds of the cost to consumers of domestically produced foods purchased for both at home and away from home use. Food marketing factors reflected in the spread include labor, packaging materials, transportation, energy, profits, taxes, rent, depreciation, advertising, and numerous other inputs used in the processing and distribution of food.

Labor is the largest component, accounting for about 46 percent of food marketing costs. Changing labor costs reflect wage increases, employee benefits, and changes in productivity. Wage increases tend to rise in line with the rate of inflation, with larger increases generally occurring in periods of sustained productivity gains, and smaller increases generally observed when productivity declines. Cost-of-living adjustments are included in many labor contracts to maintain the purchasing power of workers. Wages have increased about 9 percent this year.

Employee benefits such as paid vacations, pensions, and health programs have become a larger part of labor costs over the past decade. In 1972, they represented about 10.8 percent of labor costs while in 1979

they accounted for 12.6 percent. Because rising nominal incomes have pushed workers into higher tax brackets, benefits which are not taxable as income have become an attractive alternative to wage increases. The cost of benefits rose about 8 percent this year, adding about 1 percent to total labor costs.

Productivity declines in food manufacturing and food retailing added to unit labor costs in the late 1970's. The trend in consumer demand toward more highly processed foods and toward eating away from home added less productive service-oriented functions to the food production labor force. In 1980, however, preliminary data indicate that a slight gain in productivity in food manufacturing has occurred. This has held down labor costs and is a major reason that the 9-percent increase in the farm to retail price spread this year is lower than the general inflation rate.

Food packaging costs represent about 12 percent of food marketing costs. Prices for plastic containers, plastic wrapping materials, metal containers, paperboard, and glass containers are included. Transportation costs represent 8 percent of food marketing costs. These costs have been affected by higher petroleum prices in recent years. Direct-use energy represents about 6 percent of marketing costs. This includes energy used in processing factories and retail stores, but does not include indirect usage covered under transportation and packaging costs. Prices for these three inputs rose very rapidly in early 1980 and, with labor, were the primary cause of food price rises through midyear. Because energy prices have leveled off some in recent months, transportation and packaging costs have slowed as well, with prices for polyethylene resin and paperboard falling in the third quarter. Nonetheless, prices for transportation and packaging materials will each still average 14 percent higher than in 1979, and energy prices will average 30 percent higher.

Corporate profits represent about 6 percent of food industry marketing costs. Unit profits for food manufacturers and food retailers have averaged lower than in 1979 because consumer demand has not been strong enough to allow a complete passthrough to retail prices of higher farm values and marketing costs. This is another major factor moderating the farm to retail price spread this year, holding its increase below the inflation rate.

Besides the productivity gains in food manufacturing and the decline in unit profits, one additional factor has been important in holding down the farm to retail price spread this year. The large volume of food marketed has allowed fixed costs to be allocated to more production units, partly offsetting increases in other food marketing costs.

FISH AND IMPORTED FOODS

Coffee, sugar, bananas, and fish are the four major foods in the fish and imported foods category. Although they account for less than one-fifth of the retail food dollar, recent history shows that these products can be quite important in shaping the retail food price picture. For example, when coffee prices rose sharply in 1977 following a freeze in Brazil in the previous year, the resulting increases at retail accounted for about half of that year's food price rise. This year fish and imported food prices have added about 2 percentage points to the food

price rise. This primarily reflects higher sugar prices as production difficulties were encountered in some of the major producing countries.

1980 FOOD PRODUCT HIGHLIGHTS

Larger retail meat and poultry supplies have been one of the major causes of the smaller rise in retail food prices in 1980 than in 1979. In response to favorable hog to corn price ratios in early 1979, pork producers increased production 7 percent in 1980 with the largest supplies available in the first half of the year. Poultry producers also increased output, again with the largest production occurring in the first half of the year. Beef production has averaged slightly higher than in 1979, mainly due to drought-induced nonfed slaughter this summer and fall. This has resulted in an increase in per capita meat and poultry supplies of more than 1 percent over 1979 levels and has led to a retail price rise for these foods of about 4 percent, the smallest annual increase since 1977.

Egg production has declined slightly this year but will still be the second largest since 1972. Combined with the large supply of meat and poultry, the high level of egg production has caused retail egg prices to average below 1979 levels.

Prices for dairy products have been moderated by high levels of Government and commercial stocks. Milk production in 1980 will be about 3 percent higher than in 1979. Large meat and poultry supplies and declining real incomes have diminished demand for dairy products. However, rising processing and delivery costs and farm level price increases mandated by the price support program have pushed retail prices up about 10 percent.

Retail prices for fats and oils have averaged about 7 percent above 1979 levels. Record large oilseed production last year, led by soybean oil, along with only a small rise in oilseed usage led to an increase in stocks. Lard production also rose, primarily reflecting increased hog slaughter. These factors have kept downward pressure on retail fats and oils prices through most of 1980, partly offsetting higher marketing costs.

Prices for fruits and vegetables this year have averaged about 7 percent higher than in 1979, the smallest annual rise since 1976. Last year's apple and orange harvests both set records, providing large supplies for much of 1980. Production of many vegetables, especially potatoes, lettuce, carrots, and tomatoes, was also very high. Large stocks of processed fruits and vegetables, including frozen concentrate orange juice, tomatoes, and peas, and competition from fresh supplies kept downward pressure on prices for those foods. Additionally, many promotional discounts on processed fruits and vegetables were offered as high interest rates made inventory holding more costly.

Prices for sugar and sweets have averaged more than 20 percent higher than in 1979. World sugar production was about 6 million metric tons below consumption, the first deficit in 7 years. Reduced production in many producing countries including the U.S.S.R., Cuba, India, and Thailand, offset record production in the European Community.

Food marketing costs, especially for energy and packaging materials, have dominated price increases for cereals and bakery products

(up about 12 percent) and nonalcoholic beverages (up about 11 percent). Higher sugar prices have been an additional inflationary factor for these food groups.

Prices for food away from home this year will average about 10 percent higher than in 1979. Moderate increases in wholesale food prices and slackening demand have kept the rise in these prices below the inflation rate. Consumers purchased less food away from home as real incomes fell and travel was reduced to conserve fuel.

OUTLOOK FOR FOOD PRICES IN 1981

Weather uncertainties make it difficult to forecast food prices a year in advance. International conditions are also an important source of uncertainty. Poor crops abroad would result in increased demand for U.S. farm products and could add to food costs. A disruption in the availability of petroleum supplies from foreign sources would push all energy related costs up.

At this time, however, retail food prices in 1981 are expected to average 10 to 15 percent higher than this year (see table 3). With livestock production likely to fall next year, the farm value is expected to rise 12 to 20 percent, thus contributing significantly more to retail food price rises than it has this year.

The farm to retail price spread is expected to rise 9 to 11 percent in 1981, about the same as the general inflation rate. Labor costs are expected to rise 9 to 10 percent next year. Although a relatively low number of union contracts will be negotiated in the food industry next year, wage increases may be higher than in 1980 as cost-of-living adjustments are made to reflect inflation this year. Also the minimum wage will increase from \$3.10 to \$3.35 per hour on January 1. Employee benefit costs will rise at near the general inflation rate as the real value of existing benefits is preserved. Additionally, the January 1 social security tax increase will add to employers' labor costs.

Labor productivity represents an area of uncertainty in the outlook for total labor costs. At this time, however, a small productivity gain is expected. Many of the labor force adjustments to meet larger consumer demand for highly processed foods have been made. Furthermore, some food industry contracts have modified restrictions on the introduction of innovations. For example, in some metropolitan areas, recent contracts allow the introduction of price scanning equipment in retail stores where previously negotiations with unions were required. This will increase labor force efficiency.

TABLE 3.—COMPONENTS OF RETAIL FOOD PRICE FORECAST

[Percent change]

Food price component	1980	1981
Total food.....	8.7	10-15
Farm value.....	6	12-20
Fish and imported foods.....	12	10-17
Farm to retail spread.....	9	9-11
Labor.....	9	9-10
Packaging.....	14	9-11
Transportation.....	14	10-12
Energy.....	30	10-15
Unit profits.....	-2	2-5

Prices for energy, transportation, and packaging materials will likely increase less than in 1980 as growth in demand from sectors which compete with the food sector for these marketing inputs is expected to be slow. Transportation costs may also rise slower because of deregulation of railroads and trucks. As the economy recovers from the recession and real incomes improve, unit profits in the food industry next year are expected to average slightly higher than in 1980. With less food being marketed next year, the unit cost allocation of producers' fixed costs will be higher than in 1980.

Prices for fish and imported foods are expected to rise 10 to 17 percent next year. Sugar prices are likely to show another substantial rise because global production will be below consumption for the second consecutive year. The magnitude of this increase, however, will be extremely sensitive to the size of the production shortfall.

Conditions that would push the 1981 food price increase into the upper end of the forecast range include winter weather that damages the citrus crop and reduces livestock marketings, a poor grain harvest in the fall of 1981, another surge in the general inflation rate which would impact on food marketing costs, and an extremely poor global sugar crop. However, if weather conditions in 1981 are favorable, the general inflation rate slows significantly, and global sugar production nears consumption requirements, the food price increase in 1981 would be near the lower end of the forecast range.

1981 FOOD PRODUCT HIGHLIGHTS

Table 4 shows the retail food price forecast disaggregated by the major food products. Within the 10- to 15-percent range, the 12.2-percent point estimate represents the current assessment of the factors which affect food prices including production prospects, consumption requirements, marketing costs, and the macroeconomic outlook.

The major source of food price inflation in 1981 will come from rises in meat, poultry, and egg prices. Producer losses in the first half of 1980 resulting from rising corn prices and low hog prices will lead to declines in pork production in 1981—perhaps 8 to 10 percent. With only slight increases in beef and broiler production, 1981 per capita meat and poultry supplies will be 2 to 4 percent below this year's level, leading to a retail price rise for these foods of 15 to 20 percent, with the current assessment showing an 18-percent rise.

Increased demand for eggs, as consumers substitute eggs for meat and poultry, along with a slight decline in production will push retail egg prices up about 17 percent over this year's relatively low prices.

Prices for dairy products in 1981 are expected to rise slightly faster than this year with the price support program and rising marketing costs again being the major causes. Production in 1981 will be larger than utilization with both expected to increase marginally over 1980 levels. The resulting addition to stocks, however, will be less than in 1980.

Fruit and vegetable prices are one of the major areas of uncertainty in the forecast because of their sensitivity to weather developments. Citrus production is especially dependent on growing conditions in Florida and the Southwest. At this time, however, fruit prices in 1981

are expected to rise only moderately because of record production levels. The current apple crop and prospective orange crop are expected to exceed last year's. Supplies of most canned and frozen fruits are higher than a year ago. Frozen concentrate orange juice supplies are especially large and will grow further as the new citrus crop is harvested.

Vegetable prices are expected to rise faster in 1981 than in 1980. In response to the relatively low farm level prices in the last 2 years, potato acreage this fall was reduced to the lowest level in 15 years. The resulting decline in supplies will keep retail potato prices relatively high at least until next fall's harvest. Fresh market production this fall of 14 major vegetables was 4.5 percent lower than last year. This includes declines for lettuce (down 4 percent), tomatoes (down 3.5 percent), and carrots and cabbage (each down more than 10 percent). Contracted vegetable acreage for processing was reduced because large supplies last year and earlier this year led to very low grower and processor prices. This will cause sharply lower production of processed lima beans, beets, corn, and tomatoes.

TABLE 4.—RETAIL FOOD PRICE CHANGES, 1978 TO 1981

[Percent change]

Food category	1978	1979	1980 ¹	1981 ¹
All food	10.0	10.9	8.7	12.2
Food away from home	9.0	11.2	10.0	10.4
Food at home	10.5	10.8	8.1	13.0
Meats	18.7	17.0	3.5	17.9
Beef and veal	22.9	27.3	6.4	13.5
Pork	12.9	1.5	-2.6	27.6
Other meats	17.8	14.7	4.1	17.5
Poultry	10.3	5.0	4.1	18.0
Fish and seafood	9.5	9.8	9.2	9.6
Eggs	-5.5	9.5	-3.1	16.9
Dairy products	6.7	11.6	10.2	10.7
Fats and oils	9.5	8.0	6.7	11.0
Fruits and vegetables	11.1	8.0	7.0	8.0
Sugar and sweets	12.2	7.8	22.4	21.5
Cereals and bakery products	8.9	10.1	11.9	10.9
Nonalcoholic beverages	5.7	5.0	10.8	12.0
Other prepared foods	8.0	10.1	10.9	10.3

¹ Forecast.

Based on the Consumer Price Indices, All Urban Consumers. Source of historical data: Bureau of Labor Statistics. Forecast data estimated by U.S. Department of Agriculture.

Following this year's relatively small increases, retail prices for fats and oils are expected to rise more in 1981. Although carryover stocks from the 1979 crop rose, reduced acreage and yields this year have led to lower production of the major oilseeds (soybeans, peanuts, cottonseed, flaxseed, and sunflowers). Additionally, lard production will likely fall in 1981 because of reduced hog production.

Prices for sugar and sweets are likely to show another substantial rise next year with the size of the increase depending upon 1980/81 global sugar production. A great deal of uncertainty exists because of the limited information available about the crops in the U.S.S.R. and Cuba, and because of uncertainties about the extent of potential Brazilian use of sugarcane in ethanol production. Nonetheless, world sugar production is expected to be below consumption for the second consecutive year. Cuban sugarcane was damaged by rust disease last

year and some production decline is likely. Weather difficulties will limit sugar beet production in the U.S.S.R. and Europe, and sugar-cane production in Thailand and South Africa.

Prices for cereals and bakery products and nonalcoholic beverages may rise more than the general inflation rate next year. These prices will be affected to a large degree by food marketing costs. However, the soft drink component of nonalcoholic beverages and prices for some bakery products will be affected by the higher sugar prices. Higher grain prices will also be passed through the retail cereal and bakery product prices.

SUMMARY

In conclusion, retail food prices in 1980 will average about 9 percent higher than in 1979 and thus will have a moderating effect on general inflation. Food prices have been rising more rapidly in the second half of 1980 as the farm value of foods, especially for meats, has risen from the low levels of the second quarter.

In 1981 food prices will likely rise 10 to 15 percent. The farm value of foods will contribute significantly more to retail food prices than in 1980. The farm to retail price spread is expected to increase 9 to 11 percent with a 10- to 17-percent rise expected in prices for fish and imported foods.

OUTLOOK FOR FOOD PRICES

(By Theodore E. Young, Consultant to Fortune Magazine)

I am honored and delighted at this opportunity to be a participant in the 1981 Outlook Conference and I want to thank the many, many agricultural economists and commodity specialists in the audience, especially those in the Agriculture Department, for their help in bringing me here. It is your cooperation, your willingness to share the fruits of your labor and the rich grains of your knowledge, indeed your openness regarding the specialized skills you carry, that enables me to do my work as a consultant to Fortune Magazine.

My job is basically one of evaluating—bringing together the different viewpoints about why something did or did not happen, or, more importantly, about what is likely to happen and then selecting, from among these opinions, the most likely script. In some respects I feel like an alchemist, attempting to distill, from the many judgments and impressions around me, a neat, trim, coherent story of our agricultural world.

Fortune's Business Roundup follows the trends within our world, and also its shape, primarily as a means to determine the outlook for inflation. Because food prices represent 18 percent of the Consumer Price Index, food surpluses or shortages substantially affect the level of retail prices in general and, ultimately, Fortune's forecasting model of the economy. Sometimes food prices will be pulling up the rate of inflation, as they are now and will be doing for most of next year, and sometimes they will be holding it down, as they had been doing in the 12 months ending this past spring.

Thus, Business Roundup, as part of its responsibility to analyze economic developments and to forecast economic trends, keeps very close tabs on agriculture—so close in fact that Sanford Parker, the late chief economist at Fortune and my mentor for the past 10 years, was once referred to, by an earlier Agriculture Under Secretary, as and I quote, "The greatest, most gifted, most respected agricultural economist—east of the Hudson River." Just how much of an accolade that represented, I do not know, but the playfulness of the remark, said to me in a spirit of good humor and friendliness, was an indication of the respect the official had for him, and, of course, Business Roundup's attitude of keeping abreast of the agricultural situation.

Paul Westcott's paper is an excellent analysis of food price developments this year and a sound summation of the relevant trends affecting the outlook for 1981. It would be very difficult for me to add substantially to what he said or to come to much different conclusions. However, I would like to comment on a few, general points, and to offer my own appraisal of the prospects for next year.

Well, it has been usual in the last few years for Agriculture Department speakers at the food price panel to make the point that the Consumer Price Index, because it measures a fixed market basket of goods, may tend to overstate the amount of food price inflation. Presumably, the Agriculture Department is telling us, that, for the most visible aspect of living costs, things are not as bad as they seem. Consumers, in an inflationary environment with a myriad of foods to choose from, substitute less expensive items for those they would usually purchase if only prices were not so high—for example, pork for beef and veal, chicken for pork, beans for chicken, and so forth. In other words, consumers continually seek to lower their food (and other) costs, and the CPI is not structured statistically to respond to that effort. Now there is no denying that fact, but I believe there is a dimension here beyond the statistics that ought to be mentioned. The mere fact that consumers are forced to alter their purchasing patterns in response to sharply higher prices all around them, is an indication of an erosion in our real standard of living. It is an erosion in our quality of life; if I cannot afford beef as I once did, or am used to consuming, then I feel I am being cheated, that the American economic system is taking something away from me that I would like and once could buy. It is a human point, a psychological one and makes for a disgruntled and frustrated consumer (not to mention voter). Next year in particular, there will be less meat available and less chance for substitution. Moderately priced meats will be less abundant, so that consumers will find it much more costly to rearrange their budgets.

Turning to another point, it always startles me to observe that the Agriculture Department, in assessing recent food price developments or the outlook, does not mention, or at least hardly ever, market expectations. Speculation is an important component, of course, in the futures market, but there is also, it seems to me, enough real, silent knowledge, enough unexpressed truth in those price trends to make them a factor to be considered.

I have found the futures market to be a good guide to develop my own longer term thinking. There has to be a sound reason why commodity price forecasts, based primarily on regression equations, differ substantially from settlement quotes for some length of time. At least for me, it seems as if futures prices have a way of fulfilling themselves; they appear to mark out an environment in which actual cash sales will be transacted. What I am saying basically is that there is a real world out there, beyond statistical relationships, that should be taken into account. You have to be careful, of course, but the futures market does help to give the meaning to the trend of farm prices. For example, no regression equation that I am familiar with could explain satisfactorily the 30-percent jump in cattle prices in 1978 or the similar sharp runup in the first half of 1979. In the latter instance, there was a speculative rise in the market, caused partly by severe winter weather interrupting marketings, partly by the Iranian revolution reducing oil supplies, and generating a new round of inflationary expectations. In situations like that, the pattern of prices in the futures markets anticipate cash transactions and are a good indicator of prospective farm values.

In analyzing the determinants of food-price changes, perhaps it

is also worthwhile stressing that about 60 percent of the retail cost is governed by factors off the farm; processing, marketing, and distribution charges that have nothing at all to do with growing crops or raising livestock. After you assiduously calculate possible levels of supply and demand for the important commodities, to arrive at an estimate of farm prices, you are still left with a large chunk of retail cost that is, more or less, just programmed in, that is influenced by price trends in the economy as a whole. Perhaps that fact is not fully understood by consumers and should be stressed more; it seems as if inflation prospects pretty much provide the highway on which food costs are to travel, but farm-level commodity prices could extend or shorten the trip.

Moving on to the outlook for food prices in 1981, the Agriculture Department's estimate is for a rise of 10 to 15 percent, on average for next year. Farm values are expected to balloon 12 to 20 percent, with spreads up an estimated 9 to 11 percent. The ranges incorporate, of course, weather uncertainties, both here and abroad, and speculations as to the general rate of inflation.

Thus, in contrast to this year, when spreads were the major cause of food price inflation, in 1981, the major determinant is expected to be commodity prices, particularly livestock. Pork production will be down about 9 percent and it is this expected cutback that is the single, most devastating blow to the farm price outlook. Because the reduction is so steep, total meat supplies, including poultry, will be down some 2 percent, the first decline in 2 years. Previously, record output of pork and poultry had taken up the slack caused by sliding beef production. Accordingly, the stage is being set for another sharp rise in meat prices, close to 20 percent, roughly equivalent to the levels of 1978 and 1979, when food prices rose 10 and 11 percent respectively. The meat price runup next year will be responsible principally for the return to an increase in the double-digit range, and seems to be the basic ingredient in the food-price outlook sketched by USDA this morning.

Now, referring to my own outlook for next year, I would expect food prices higher than the current assessment; in fact I would consider the 12.2-percent point estimate to represent the minimum increase. Assuming a gradual improvement in economic activity from the fourth quarter on, I am looking for food prices to be up 13.5 to 14 percent, an increase very near the high end of the range predicted by USDA. That rise would be just below the record of 14.5 percent in 1973—and it is not unthinkable, assuming some poor crops along the way, that the record could be surpassed. Here are my reasons: One, the futures market is currently reading levels above those expected by the Agriculture Department for most of the grains and soybeans. Sure, speculation is always a factor, but I believe the trade is looking for higher exports and tighter markets next year than the United States is counting on. Perhaps the recent 20-million-ton reduction in Soviet grain crops is one reason for some of the disparity. At least for Fortune, corn and the feed grain complex is the most critical determinant of food-price trends. The size of the corn crop and the estimated carryover affects the price of feed, which influences the supply and the price of livestock products, which accounts for

more than half of farm values. It is difficult for me to uncover any good reason why the corn price will retreat much from recent levels, except when 1981-82 production prospects begin to make themselves known. Until that time, given larger world demand for grain and smaller supplies, perhaps some poorer prospective planting conditions in the United States, and the macroeconomic outlook, all the pressure is on the up side.

Two, a second reason for higher food prices is the outlook for oil. The Iran-Iraq war is a source of major instability in the economic situation. The loss of production in both countries of nearly 5 million barrels per day, if continued well into 1981, could generate another round of sharp price increases. Unless other OPEC countries take up more of the slack than they have been willing to do so far, or consumption declines, prices of imported crude oil could average \$46-\$47 per barrel next year, a rise of close to 40 percent. That would be substantially above the 10 to 20 percent that seemed likely before the onset of hostilities, but less than the 60-percent increase this year. It would add perhaps 2 or more percentage points to the level of the CPI in 1981, and be the source of a new round of inflationary pressures. If so, farm to retail price spreads would exceed the range forecasted by the Agriculture Department.

In summary then, taking into account the current level of prices in the futures market, plus a somewhat pessimistic, or maybe realistic, appraisal of oil prices and their impact on the inflation rate, I would expect food prices to be exceeded by between 1 to 2 percentage points, the point estimate forecast by USDA for next year. Additionally, poor weather affecting 1981 grain crops either here or abroad, would pull the increase higher—perhaps to a new record level. That is not a very happy prospect to be considering here, so early in the morning, and is a real thorn in our battle to reduce the very high cost of living.

I thank you.

THE ECONOMIC SETTING FOR AGRICULTURE IN THE EIGHTIES

(By Howard W. Hjort, Director of Economics, Policy Analysis, and Budget,
U.S. Department of Agriculture)

Good afternoon.

I am pleased to begin this session of the 1981 Outlook Conference on Policy Directions for the 1980's. Clearly, discussions at this and four related sessions will deal with the many factors which shape agriculture and should provide an idea of the policies which will be needed to guide and respond to future events affecting our agricultural sector. Furthermore, with the need to either extend or replace the expiring Food and Agriculture Act of 1977, these sessions are particularly timely.

Next to weather, I can think of no other factor which affects both the production and demand side as does the economic setting. In my talk today, I will present a series of slides which graphically demonstrate some of the changes that have taken place in U.S. agriculture. These changes are the consequence of events—be they social, economic, political or weather related.

After reviewing these charts, I will address the factors behind these dramatic changes in U.S. agriculture, and then discuss prospects for the future and the implications they have for U.S. agriculture.

THE VOLUME OF U.S. AGRICULTURAL EXPORTS

The first chart shows the growth in the volume of U.S. agricultural exports.* Increases have been particularly rapid since 1970—from about 62 million tons to 169 million tons in 1979–80 and a forecast 170 million tons or more in 1980–81. For the decade as a whole, annual increases averaged 10 percent.

From a volume standpoint, our exports have and continue to be dominated by grains. They account for about 70 percent of the volume total, with feed grain and food grain exports accounting for 44 and 25 percent, respectively. While the rate of growth has been faster for sunflower seed, peanuts, and livestock products, the largest increases have been in bulk products such as feed grains, and, to a lesser extent, food grains and oilseeds.

THE VALUE OF U.S. AGRICULTURAL EXPORTS

The second chart shows the value of our agricultural exports. Our agricultural exports rose more than 18 percent per year from \$7 billion in 1970 to \$40.5 billion in 1980, and another gain of at least \$7 billion

*The charts referred to appear at the end of this paper.

is in prospect for this year. Growth in value of exports among the major commodity groups has been most rapid for cotton, than for feed grains, food grains, and oilseeds. Approximately half of this value gain since the mid-1950's was due to the larger volume; the remaining half due to higher commodity prices.

THE AGRICULTURAL AND NONAGRICULTURAL TRADE BALANCE

The third chart shows that the favorable trade balance on our agricultural accounts is a relatively recent phenomenon. It also shows our nonagricultural trade account moved into the red relatively recently. As it makes evident, an agricultural trade balance of \$22 billion does not offset the negative on our nonagricultural trade balance. Petroleum imports were the big factor in the swing in the nonagricultural trade balance, from an import deficit of only \$68 million in 1951-55 to a deficit of \$72 billion by 1980.

U.S. PLANTED ACREAGE

The fourth chart shows the increase in acreage planted to crops. From the 1930's to the early 1970's, there was a gradual decline in acreage planted to crops. Since then, the trend has been reversed. In 1970, 235 million acres were planted; in 1980, 301 million acres were planted—an increase of 66 million acres or 2.3 percent per year. Another significant increase is in prospect for 1981 crops. There were no set-aside or diversion programs in effect during 1980, nor will there be in 1981.

From 1970 to 1980, total farm production increased 25 percent. Acreage increases accounted for slightly more than half of the gain while increases in yields accounted for the balance. The increase in planted acreage has been most rapid for wheat, then for oilseeds and corn. Acreage used to produce hay has been relatively stable but there have been declines in acreage in pasture and forest acreage and for crops such as oats, sorghum, and barley. The rate of growth in planted acreage has been most rapid for sunflowers, soybeans and, corn.

Growth in yields has been most rapid for corn but increases have been registered for food grains and oilseeds.

FARM PRODUCTION EXPENSES

The fifth chart illustrates the explosion which has occurred in farm production expenses, particularly in the last decade. In 1970, production-related expenses totaled \$44 billion; in 1980 the estimate is \$131 billion—an increase of \$87 billion. The average annual increase in farm production expenses from 1970 to 1980 was 11.5 percent. The most rapid rate of increase was observed in fuel and energy, then for interest, fertilizers, and chemicals.

CASH FARM INCOME

Total cash income in 1970 was \$55 billion; in 1980 it was \$143 billion—an increase of \$88 billion. Total cash expenses increased from

\$37 billion to \$110 billion—a gain of \$73 billion. Net cash income rose rapidly early in the 1970's and then proceeded to decline significantly through 1977. The average annual rate of increase in cash income from 1970 to 1980 was 10.5 percent; the average annual increase in cash expenses was 11.5 percent, leaving an average annual change of 9 percent in net cash income.

FARM LABOR FORCE

After declining rapidly in the 1950's and 1960's, total agricultural employment has been relatively stable. From 1970 to 1980, there was a decline of about 170,000 or about 17,000 per year. The rate of decrease since 1970 has averaged one-half of 1 percent per year. This is in sharp contrast to the 3.7-percent average annual decline observed during the 1960's.

Total agricultural employment consists of agricultural wage and salary workers as well as self-employed workers. There has been a steady increase in the number of agricultural wage and salary workers during the decade of the 1970's, while the number of self-employed farmers has continued to decline.

VALUE OF LAND AND BUILDINGS

The final chart shows the explosion in the value of agricultural land and buildings. In 1970, the average per acre value was \$196; by 1980, it had risen to \$641—an increase of \$445. The average annual rate of growth in the value of land and buildings from 1970 to 1980 was nearly 23 percent.

CHANGES IN THE ECONOMIC SETTING OF U.S. AGRICULTURE

Now that we have had a quick look at what has happened in recent years, it is time to seek answers to the question: Why?

The United States was founded on an agrarian-based economy and from our earliest history on, agriculture was geared to produce for markets in Europe. This reliance on foreign markets has expanded—especially in recent years—so that U.S. agriculture has become integrated into the international and domestic general economies and as a result, it shares in all the favorable and unfavorable implications of that integration.

While the number and the complexity of the trade relationships linking U.S. agriculture to the rest of the world have steadily increased since World War II, the pace of internationalization accelerated substantially in the 1970's. From the mid-1950's on, a series of policy shifts were made enhancing agriculture's linkages to the world economy. The food-for-peace program established in 1954, the short-term credit programs established in the mid-1950's and expanded in the 1960's, the reduction in market-support prices in the mid-1960's for grains, and in this decade the cooperative market development programs and increased credit for commercial exports were important factors. Realining our foreign exchange rates in the early part of the

1970's also contributed to the U.S. competitive position in world markets.

Coinciding with these important events, policies by other governments—particularly the Soviet Union in 1972 and China more recently—changed dramatically as they entered world markets seeking substantial quantities of agricultural products.

But throughout the postwar period, the record clearly shows that foreign production has not been increasing as rapidly as foreign consumption. From 1950 to 1980, world agricultural production—excluding the United States—increased at an annual rate of 2.8 percent; consumption rose at a 2.85-percent rate.

Per capita production climbed at a 0.90-percent rate; consumption at 0.95 percent. These differences, although appearing to be extremely small, led to a 4.95-percent annual increase in agricultural trade. The growth in U.S. agricultural trade averaged a healthy 6.4 percent—a rate that stands in sharp contrast to the 1.7-percent annual increase in consumption in the United States.

However, it is instructive to split these years into two time periods—from 1950 to 1972, and from 1972 to 1980. During the latter period, both the growth in foreign production and consumption slowed, but the decline in production was greater. Therefore, the growth in trade has been faster—from 4.7 during 1950–72 to 5.65 percent for 1972–80.

While the annual growth rate in U.S. trade was 5.5 percent during the earlier period, it accelerated to 8.9 percent from 1972 to 1980. For these 8 years, the annual increase in domestic consumption slowed to 1.2 percent.

Several economic forces have been at play to cause such sizable demands for U.S. agricultural products.

Record-breaking growth in population, increased affluence and declining real prices combined during most of the last three decades to expand demand for agricultural products abroad at a rate double that of the first half of the century—2.9 percent per year. With foreign population increasing 75 percent in those 30 years, the increase in the sheer number of people alone would have generated two-thirds of the period's increase in demand if growth in income had been distributed evenly enough to transform food needs into market demand. However, growth population and food demand were not evenly distributed and many areas of the world experienced declining per capita consumption levels. Hence, population-related increases probably account for only about half of the total gain in food demand. The balance can probably be attributed to a variety of economic factors.

In most of the high-income and certain middle-income countries, annual real increases in per capita incomes averaged 3 percent and probably generated increases in per capita demand of 1 percent or more annually. In the most affluent developed countries, demand for meat, milk and eggs, and the feedstuffs used in their production altered the composition of demand significantly and thus accounts for a disproportionately large share of total growth in demand.

Because the traditional food-exporting countries—including the United States—were able to produce enough to match or exceed world demand, real prices of commodities actually fell about 1 percent an-

nually in the postwar period. With supplies readily available, the world market was essentially a buyer's rather than a seller's market.

By the middle and late seventies, however, events demonstrated a marked shift in the world's agriculture situation. While oversupply was the traditional problem, worldwide growth in agricultural production slowed and interannual variability increased. World food trade—largely supplied by the United States—played an even larger role in sustaining strong—albeit somewhat lower—rates of growth in consumption abroad. In the resulting imbalances, real prices fluctuated widely, hitting an all-time real high and postwar low within a span of only 5 years—1973 to 1977. Clearly, the world had reached a point where the margin between oversupply and undersupply was precariously thin and where U.S. agriculture was even more vulnerable to world imbalances.

THE ROLE OF U.S. AGRICULTURE

Throughout its history the U.S. farm sector has demonstrated its capacity to meet world demands for agricultural products. In this century, technological advances were introduced in the form of new machines, improved farming methods, and continued land development. As a result of their effectiveness, our capacity to produce farm products stayed well ahead of growth in foreign and domestic demand. The result was "disequilibrium" in agriculture—too many resources devoted to food and fiber production. This condition manifested itself as unemployment or underemployment, low returns to agricultural labor, and low commodity prices. While policies and programs were designed and implemented to bolster the agricultural economy, the exodus from the farm, begun in the thirties, continued.

With the tightening of the world food balance of the early seventies, U.S. producers suddenly were thrown into the world market, and they no longer remained insulated from events in the larger economy. And because U.S. agriculture had become increasingly technical, relying more on purchased inputs and credit and increasingly more like other businesses, it was no longer immune from occurrences in the domestic economy. When oil prices soared in the early seventies, agriculture was hit extraordinarily hard. When credit became tight, agriculture suffered along with the rest of the economy; this has been particularly true for those producers who expanded their operations in the seventies and bid for ever-more-expensive farmland and other inputs, and relied on the returns from their production to service increasingly heavy debts. As world supply-demand conditions have fallen into a more comfortable equilibrium and prices have adjusted accordingly, these producers have been caught in a particularly acute cost-price squeeze.

FACTORS AFFECTING FUTURE DEMAND

To understand the likely course of events here and abroad and the problems facing U.S. agriculture in the eighties, it is helpful to review the principal determinants of demand for the future. Having

done that, I'll discuss the supply prospects for meeting those demands and the implications associated with them. I would note, however, that while I highlight demographic and economic factors, agricultural and trade policies decisions will be equally important determinants of growth in demand.

POPULATION

While the rate of world population growth has peaked and will continue to slowly decline, absolute growth in population has never been higher and will continue to rise in the eighties. Asia, Africa, and Latin America already account for about 73 percent of the world population; they will account for about 87 percent of the growth in population.

Even though the population growth rate will decline, the population-related growth in agricultural product demand will rise more rapidly in the eighties than it did in the seventies. Not only will the absolute increase in population be larger but as the world's population ages, the average caloric food requirement per person will rise.

In the eighties, demographers foresee little change in the more affluent countries' already-low growth rates. In the developing countries, population growth rates should continue to decline in the most affluent countries, and absolute increments should peak toward the end of the eighties. Growth in the lowest income developing countries—already representing about half of the world's population—however, is not expected to peak until the early nineties, and absolute increments will continue to be record large through the end of the century.

ECONOMIC CONDITIONS

Although their specific forecasts vary, most macroeconomic forecasters believe that the economic outlook for the eighties will be less favorable than in the fifties, sixties or even the seventies. In the very early eighties a slowdown in world economic growth and serious, persistent problems of inflation and unemployment are expected. But the recovery, when it comes, is likely to be more prolonged than in past cycles.

While the pace of inflation in the early eighties is expected to slow somewhat from recent levels, it is difficult to project much improvement in the general rate until the second half of the decade. Price inflation was higher in the seventies than in the sixties, and higher in the sixties than the fifties. Reversing this trend will not be easy, especially with agricultural commodity prices rising even in real terms. If governments in many countries use monetary policies more heavily in their anti-inflationary efforts and if energy price increases are allowed to be passed on to consumers to speed adjustments, the second half of the eighties could see some marked improvements in curbing inflation.

The implications of this bearish economic outlook for the agricultural sector are best observed by contrasting their impact on the developed and developing countries. While developed country

economic prospects vary widely, they are without exception much poorer than for most of the past two decades. In the early eighties we expect to see slow economic growth even in economic leaders such as Germany and Japan. Inflation rates in the most seriously affected countries are expected to run nearly double the rates of the seventies in the early part of the decade before slowing later in the decade.

In the early eighties even the traditionally low-inflation countries are likely to face rates 1 to 3 percentage points higher than in the past 20 years. Unemployment rates will probably run higher throughout the decade.

Several factors cloud even these expectations. Higher energy costs, possible short supplies, and higher prices for other inputs needed in the developed countries' economies, lagging improvements in productivity, declining savings rates, and built-in inflationary expectations could all weaken even these bearish expectations.

The impact of these uncertainties on developed countries' agriculture is likely to be mixed. Poorer economic prospects and the input supply problems underlying them will tend to dampen growth in demand for agricultural products and may weaken many of the industrialized countries' comparative advantage in agricultural production. On balance, though, it could be that poorer economic performance in the developed countries might generate somewhat slower growth in agricultural supply, only a modest slowdown in growth in agricultural demand, and, consequently, stronger growth in import demand.

In the developing countries, the variations are extreme. The oil-importers as a group face an even more pronounced slowdown in economic growth and increases in inflation and unemployment. Slowdowns are likely to be particularly severe in areas such as South Asia and sub-Saharan Africa where the early eighties will generally be a period of economic stagnation. With the cost of importing oil the principal factor for such a bleak scenario, switching to alternative energy sources or less energy intensive practices could modify this outlook, but in many cases, doing so may slow development prospects for the eighties even more. Compounding this dismal economic outlook for developing oil importing nations are problems associated with smaller trade and private capital flows from the developed countries. Any reductions in development assistance would also have severe repercussions for them. On the other hand, economic prospects for the oil-exporting countries and selected middle-income countries such as Korea, Taiwan, Malaysia, and Ghana, are considerably brighter. Among the established oil exporters, growth may average only slightly below the record rates of the late seventies.

These two radically different outlooks are likely to keep growth in developing countries' food demand close to the rate and comparable to the patterns of the sixties and seventies. With poor economic prospects ruling out all but the most critical food imports in the lowest income developing countries, demand growth will probably remain near the rate of growth in domestic production. More than offsetting the lowest income countries' poor prospects, however, are favorable prospects for record growth in food, feed and fiber demand in the oil-exporting and

elected, high-growth developing countries. Thus, the rising incomes in countries with a combined population of more than 600 million people will increase the quantity of food demanded and change the mix of products consumed. More food—especially traditional foods, such as grains, starches and pulses—will be demanded by the lower income groups who make up half these middle income countries' population. But increasing affluence in the wealthier half of these countries' population will also generate demand for more livestock products and cause rapid growth in demand for grain and oilseed meal for feed.

Overall, world demand for agricultural products is likely to expand at a near record rate of 2.5 to 2.7 percent annually.

WORLD FOOD PRODUCTION

Foreign supply prospects over the decade of the eighties point toward a slowdown in growth from the rates of the sixties and seventies. Since World War II, increases in foreign food production, at about 2.8 percent per annum, were largely attributable to expanded resource use, productivity gains and what now appears to have been abnormally good weather conditions. Expansion in resources alone was responsible for at least a third of the gains in world food production. The rest was the result of improved farming practices, wider use of yield-enhancing inputs and adoption of higher yielding plant varieties.

But the world is not in a position to repeat the performance of the fifties, sixties or even the seventies. Production gains in the eighties, due to expansion in arable area are likely to be significantly smaller than for any other period over the past three decades. Most readily available land and water resources are already in use. Moreover, the resources available to commit to agricultural production in the eighties tend to be more fragile, less productive and generally more costly to cultivate.

Constraints on natural resources imply that future increases in food production will have to depend more on accelerating growth in productivity. But sustaining, let alone increasing, productivity will be very difficult given what are likely to be higher forced yield enhancing inputs. The high cost of energy related inputs will limit many producers' ability to expand their production, especially in areas where such inputs are widely used. In areas where there is potential from energy-related improvements, their high cost could preclude their introduction.

Given this outlook for growth in resources and productivity, agricultural production abroad could slip to only three-quarters of the rate of the sixties and seventies.

A scenario such as the one I just described would mean that by 1985, the world outside the United States would be dependent on the United States for 15 percent of its agricultural supplies—compared with 2 percent in the early fifties and 11 percent in the late seventies. U.S. exports of agricultural products would have to expand 6 to 8 percent per year.

Demand would be greatest in feedstuffs such as coarse grains and oilseeds, moving into the so-called middle income countries. These same

countries are also likely to become major importers of vegetable oils and other processed agricultural products produced only in limited quantities domestically.

Import demand for feedstuffs is also likely to continue strong in many of the established markets such as Western Europe and Japan.

Even though food needs are likely to grow at record rates in the very poorest countries, commercial trade is likely to be limited to purchases of the most basic food grains in years of pronounced crop shortfalls. This would imply a need for an increased food aid commitment at a time when world supplies are likely to be tighter and prices relatively high.

Moreover, many of the factors I've identified suggest demand for U.S. products abroad could become significantly more variable from year-to-year. As world acreage is expanded into marginal areas which are more subject to weather-related fluctuations in production, and as more countries move to protectionist domestic policies, the magnitude and frequency of fluctuations in foreign demand are likely to widen even further. This would tend to mean larger year-to-year swings in world to be absorbed to an increasing extent by the world's residual agricultural supplies—the United States. These two factors combined could result in another doubling of variability in the 1980's and generate interannual swings in foreign demand for U.S. grains and oilseeds of 30 million metric tons by 1985.

THE U.S. CAPACITY

Meeting the production and trade challenges of the 1980's implies serious adjustments in U.S. agriculture. If U.S. production is to meet projected growth in export demand as well as increases in domestic demand, our agricultural plant will have to operate closer to capacity than ever before. This implies more of our agricultural and nonagricultural resources will have to be used even more intensively to produce food. For the first half of the decade, however, fluctuations in demand and supply could be wide enough to require use of programs which adjust production in line with demand. This means that policymakers may face an extremely volatile situation not unlike that of the late 1970's.

However, by 1990, or even as early as next year, the world may face the possibility of seriously tight food supplies. Developing contingencies to deal with such a possibility will require a careful assessment.

U.S. DEMAND AND SUPPLY TRENDS AND PROSPECTS

Like the rest of the world, population and income have been the key factors determining U.S. demand for food and feed. Over the last 30 years, domestic demand has accelerated at about 1.5 percent annually. Less than two-thirds of that growth stemmed from our increasing population; increased affluence and abundant supplies of low-price products generated a 0.4 to 0.5 percent per capita annual increase in demand and a shift in the composition of demand toward grain-fed livestock products. During the next few years, forecasters expect pop-

ulation and income-related demand to increase at a rate about three-fourths of that of the past two decades. However, major increases in fuel production from agricultural products could well push that total demand for agricultural products up to 1.6 to 1.8 percent per year, or about the same as the 30-year average, but well above the 1.2 percent rate since 1972.

This forecast assumes that the United States is moving toward a zero population growth in the 1990's and that the U.S. economy—like that of many other developed countries—will lag until well in the 1980's. Economic growth in the first half of the decade may not average 2 percent per year compared to 2.9 percent above the 1970's. Inflation in the early 1980's is expected to average over 8 percent per year compared with 6 to 7 percent for the 1970's. Unemployment is expected to average 6.5 to 7.5 percent compared with 5 to 5.5 percent in the 1970's. Real growth in disposable personal income is expected to slow to about 1 percent during the first part of the decade; in the 1970's, real growth in disposable personal income averaged 2 to 2.5 percent. By the middle 1980's, however, prospects improve.

Such domestic and foreign demand factors would suggest that demand for U.S. farm products could grow as much as 2.8 to 3.0 percent per year and fluctuate as much as 10 to 15 percent from year to year in the early part of the decade.

It is certainly within the U.S. agricultural sector's physical capacity to expand output at least 3 percent per year through acreage and productivity gains. But this implies greater pressure on both resources and inputs and the emergence of a number of complicating factors. The expanded acreage, intensified land use, and increased input use needed to expand production 3 percent or more per year over the 1980's will come only at greater environmental and economic costs. The economics of production will have to be significantly more favorable in both the short and long run to encourage appropriate investment to achieve these goals. Also in question will be the role of Government policies—commodity, transportation, and marketing policies in particular—and their effect on our ability to export.

Furthermore, with the current economic forecast for the 1980's, farm product prices will have to rise substantially for producers to cover their rising costs of production. Moving and handling such quantities of production will also put a physical as well as economic strain on other sectors of the economy. Storage, grading and transportation facilities and services all would have to be improved.

U.S. agricultural policies must be developed and used to deal with:

Dramatically rising demand for U.S. agricultural products from abroad, with the possibility of large annual fluctuations in that demand;

Relatively slow food and feed-related domestic demand but relatively strong demand for energy-related needs;

A slowed rate of productivity growth in the U.S. agricultural sector;

A finite amount of additional cropland and a limited quantity of good cropland;

Dramatic increases in costs of production which are evermore tied to economic conditions in the general economy;

A small and slowly declining number of producers on larger units accounting for most of the farm product and who are most heavily debt leveraged and relying almost entirely on income from farm sources;

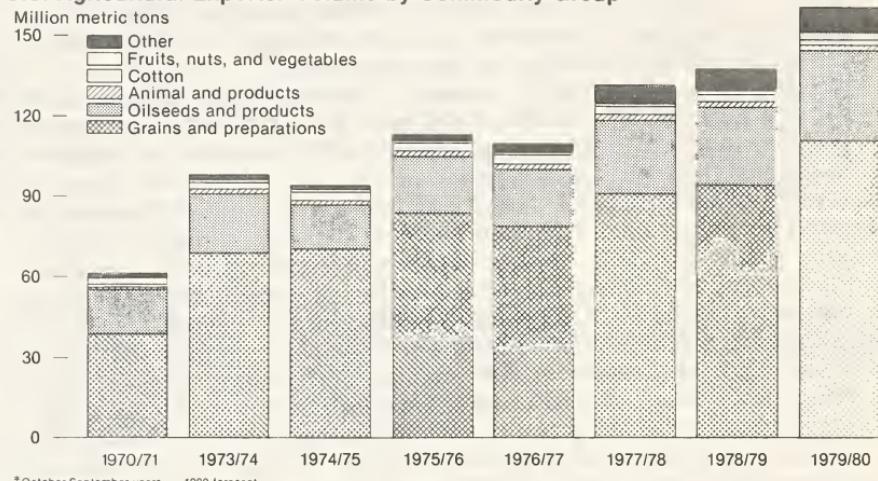
The majority of farms producing little of the total value but mainly relying on off-farm income for their living;

Real increases in food prices; and

A broadened constituency involved in the realm of food and agricultural policy and decisions.

These factors will be addressed within the broad national economic and political realities of the 1980's. In and of themselves, they constitute some of the important policy issues.

U.S. Agricultural Exports: Volume by Commodity Group



* October-September years. 1980 forecast.

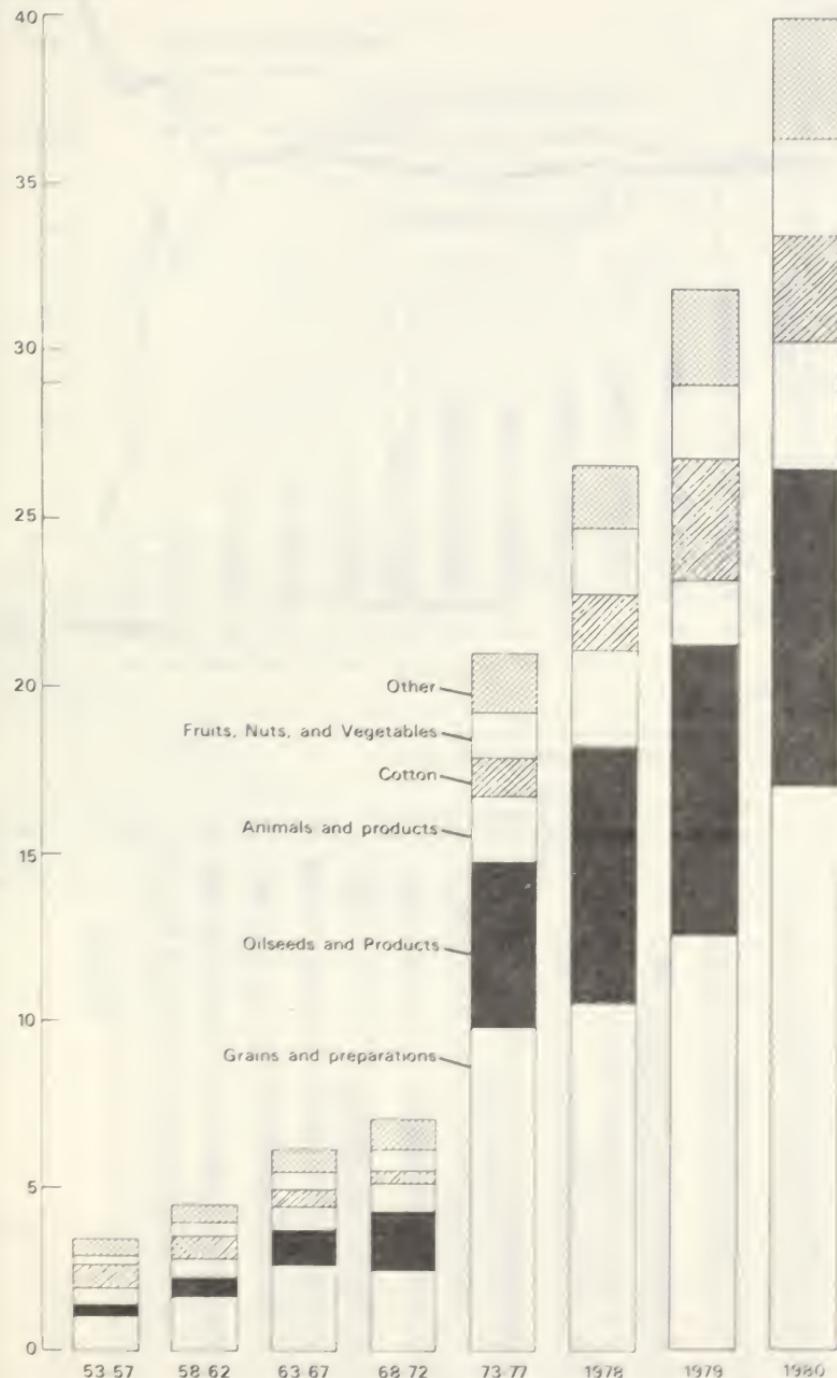
USDA/ESS

NOVEMBER 1980

CHART 1

U.S. AGRICULTURAL EXPORTS

\$/BILLION



USDA/ESS

NOVEMBER 1980

Agricultural and Nonagricultural Trade Balance

Billion dollars

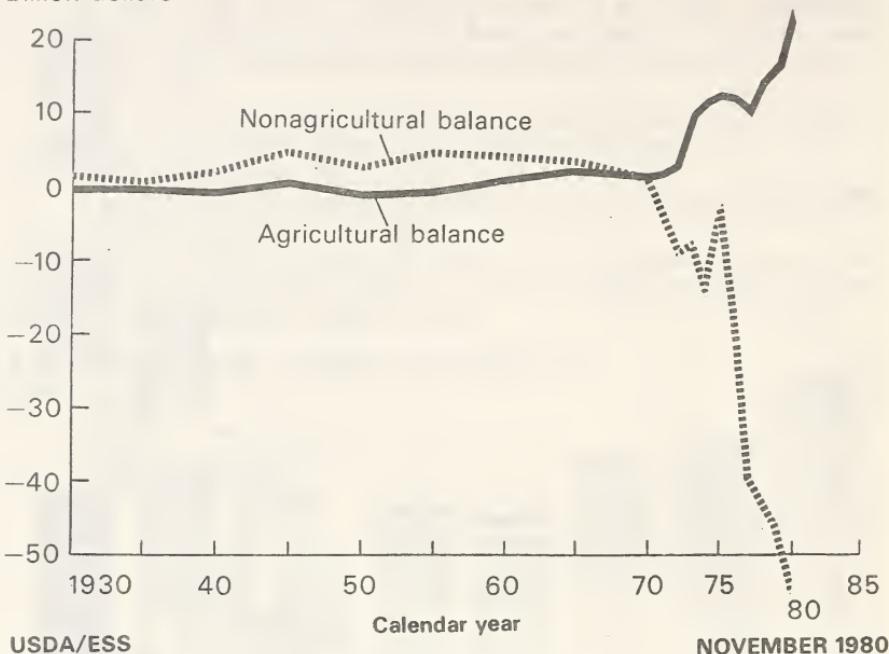


CHART 3

U.S. PLANTED ACREAGES

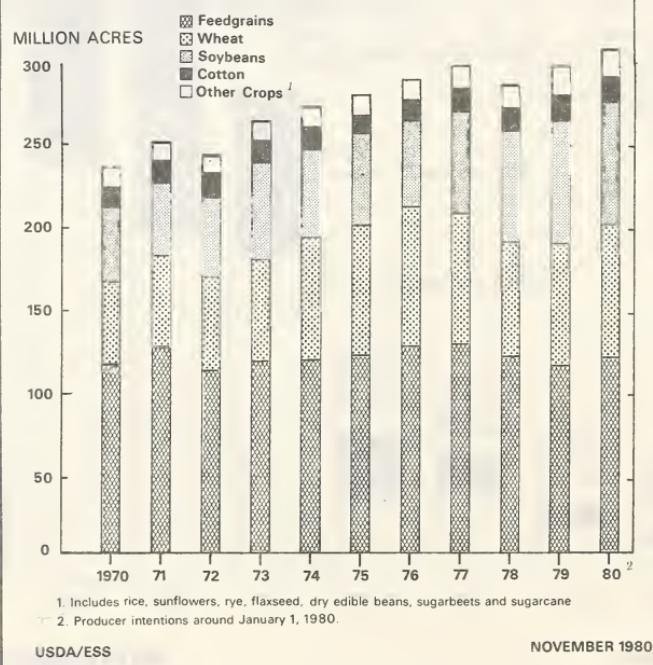
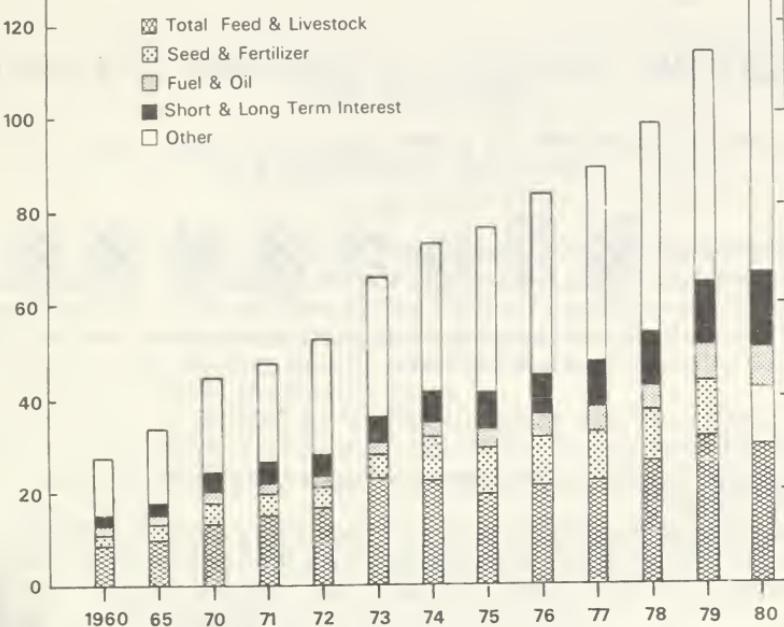


CHART 4

FARM PRODUCTION EXPENSES

\$ BIL. DOLLARS



Other includes depreciation, taxes and rent, labor and repair and all others.

USDA/ESS

NOVEMBER 1980

CHART 5

Cash Farm Income, 1970-80

\$Billion

150

100

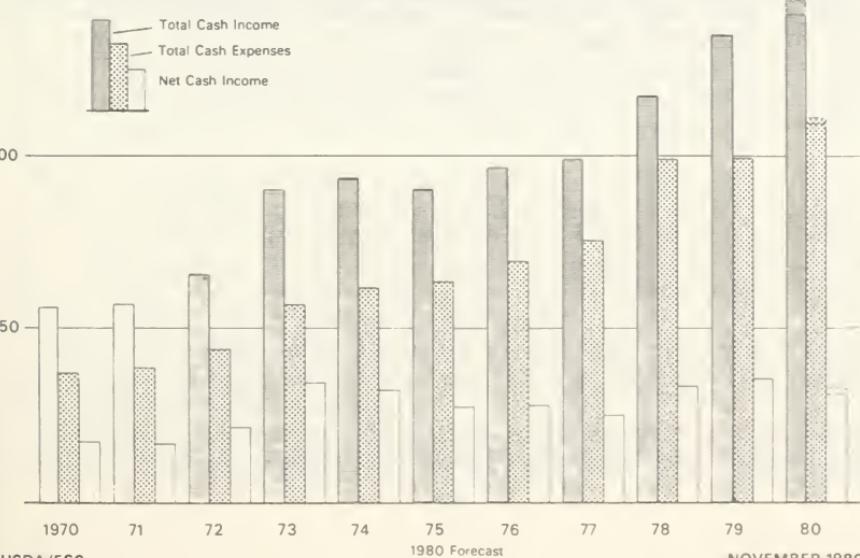
50

100

Total Cash Income

Total Cash Expenses

Net Cash Income



USDA/ESS

NOVEMBER 1980

CHART 6

AGRICULTURAL EMPLOYMENT

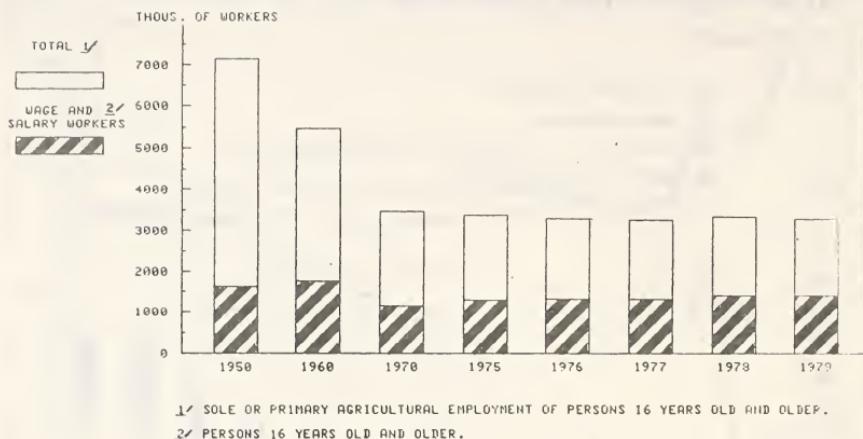


CHART 7

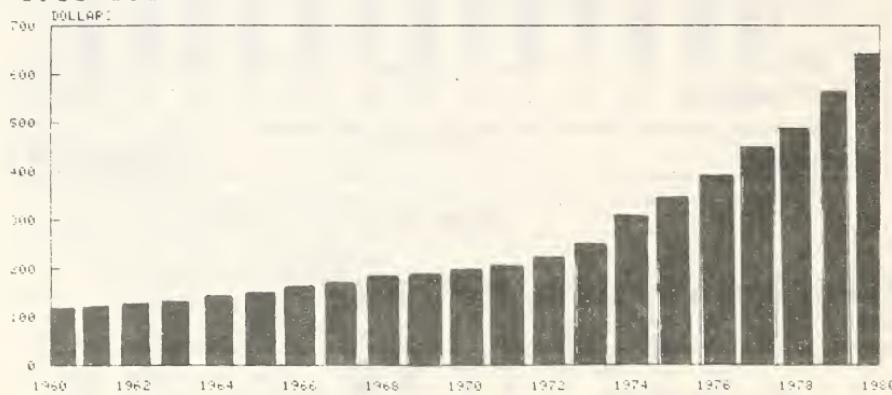
AVERAGE VALUE PER ACRE OF LAND AND BUILDINGS
1960-1980

CHART 8

FOOD AND AGRICULTURAL RESEARCH AGENDA FOR THE EIGHTIES

(By Anson R. Bertrand, Director, Science and Education Administration,
U.S. Department of Agriculture)

The future of agricultural research must have seemed particularly promising in 1923 when the first of these outlook conferences was convened. That first conference was itself a response to the increasing effect of outside forces on the agricultural economy. Markets had begun to expand and farmers needed more information in order to make intelligent, effective production plans.

A new age of technology had also reached American farms. The lightweight gasoline tractor was just coming into its own. The breakthrough on hybrid corn had been accomplished and would be put to use in the 1930's.

All through those years, the seeds of the coming revolution in production continued to be sown by agricultural researchers—even as the country suffered through the Great Depression and our farmers endured countless tragedies caused by the Dust Bowl.

In the 1940's, America's farms set food production records that sustained us through World War II. Then followed the real liftoff powered by science: the wonder age of antibiotics; new pesticides; improved fertilizers; vertical integration; controlled livestock environments; mechanized farming; and cheap energy. Record yields followed one after another, carrying us through the 1950's and into the 1960's on a wave of "What will science think of next?" and "What will we do with all this food?"

One cannot look back on all those years of magnificent accomplishments without a degree of wonder at the naivete that took so much for granted. For much of that period the sheer abundance of food dazzled many, while others were occupied in finding ways to deal with it. Scientists themselves sounded many of the early warnings: resistance to insecticides; the loss of valuable germ plasm; the pollution of water.

By the midsixties, Rachel Carson had written her book, and much of the promise of the previous years had already begun to turn to protest. Those outside the scientific community learned what many within had always known: That science can create problems as well as solve them. Others still needed to learn that social values belong in any balance sheet financed for the "public good."

Now at the threshold of the 1980's we are entering a new era—one that holds challenges as tough as any faced in the nearly six decades since these conferences began.

I doubt that the participants of previous conferences who undertook to view the decade ahead could have seen before them such a broad

array of problems already in place and threatening progress along so many fronts.

One also has to be struck with the fact that probably never before have we been able to see so clearly so many of the challenges that lie ahead of us. The view convinces me that no endeavor facing this Nation today is more complex or more important than that of increasing the ability of our food and agricultural system to produce and to do so within a framework that is compatible with so many competing interests.

Forces already in motion are shaping our future and compel us to gain a better sense of the broad range of alternatives that lie ahead of us.

I propose today to touch briefly on some of the broad issues facing us, and mostly within that context share with you some of the more promising, and the more difficult, items on our research agenda for the 1980's.

I. SOME GLOBAL CONSIDERATIONS

The Global 2000 Report¹ published earlier this year analyzes world expectations for the next two decades in terms of population, resources and environment. Serious stresses are clearly visible ahead. Among them:

- Several inches of soil eroded from croplands all over the world;
- Accelerated deterioration of soil nutrient supplies;
- Soil compaction;
- Salinization of land and water;
- Crop damage due to increasing air and water pollution;
- Severe regional water shortages;
- Air quality worse as increased amounts of fossil fuels are burned;
- More acid rain;
- World water quality worse;
- And more people—55 percent more than in 1975.

Some reviews of the Global 2000 Report hold that the projections understate the severity of the problems. Many hold only the hope that a keener awareness of the problems may induce changes that will alter the projected outcomes.

It is clear that the gap between the rich and the poor of the world will be a continuing part of the international scene. That gap will help account for the "hungry, quarreling, uneasy" world in which agriculture will have such a large role to play. We have not made much progress. We cannot ignore the evidence that there are today probably more hungry, malnourished people than there were 6 years ago when the World Food Conference in Rome focused attention on the world's hungry.

It is essential that less developed countries formulate long-term national food strategies. It is in our interest to help them do so. For many years the U.S. scientific and agricultural community has carried a heavy burden of research and development work for much of the rest of the world. Our European and Asian colleagues also make major

¹ "The Global 2000 Report to the President, Entering the Twenty-First Century," vol. I. Superintendent of Documents, Government Printing Office, 1980.

contributions, but some developed countries have not carried their fair share. New initiatives must be launched to encourage other nations to join with us in common research and development goals and to carry a larger share of this work.

We in the agricultural sciences are increasingly and inextricably bound to world events. The basic industries of agriculture and forestry are interdependent with other sectors of both the domestic and world economies. Agriculture depends today on a rapidly expanding export market for our farm food and feed commodities and our Nation relies on these exports to help offset a growing deficit in international trade. At the same time, elsewhere in the world, a dependence is established on our agricultural exports as a secure future food supply.

A major challenge on our research agenda is to find ways of maintaining and improving our technology base in food and agriculture—in production, in processing, in distribution—so that we can continue to participate as a principal contributor in world trade, without depleting our own natural resources.

II. DOMESTIC DEMOGRAPHICS

Few people today are aware of the dimensions of the changes that lie in store for us due not only to population growth but also to coming changes in the mix of our population by such factors as age, ethnic background, and economic levels.

We know these changes in our population mean changes in the numbers and kinds and whereabouts of our work force—our elderly—our young people—and that all of these and more will influence agriculture. But we do not know how it will be influenced.

There is also the matter of migration. In the past, migrations from east to west, south to north, and rural to urban have influenced us greatly. Now the trends are north to south and urban to rural. How long will these trends endure, and what do they portend? Communities that have spent years adjusting to population decline are now faced with providing and financing services to new residents. Resources are being strained in some areas to provide for increasing needs in education, health care, job opportunities and training. We need more data and more research to help us determine the nature and scope of these trends and how to resolve the problems that arise when the benefits and costs of this new rural economic expansion are unevenly distributed. We need to team demographers, sociologists, economists, and others to conduct research to develop the answers required for intelligent planning.

III. OUR AGRICULTURAL CAPACITY

The increasing concern we see today regarding our future agricultural capacity is justified in the face of projected increases in population; a larger role for our agricultural output in world trade; and the possibilities for using agricultural products as substitutes for nonrenewable resources or to augment supplies of otherwise scarce commodities.

Since both new land and new water for agricultural development are scarce, and the quantity and quality of our natural resource

inputs must be carefully managed and husbanded, most of the capacity increases in the years ahead will have to come from productivity improvement.

A. Crop productivity

Traditional approaches to plant breeding and improving plant physiology have played an important part in achieving and maintaining high levels of crop yields in the United States. These approaches will continue to serve in the short run to improve crop yields and nutritional quality.

Plant breeders will continue to cut losses by developing plants that can better withstand environmental stresses associated with temperature, moisture, air pollution, soil salinity and acidity. Crops that can be grown economically on low-producing land must also be developed.

Of the emerging technologies, photosynthetic enhancement, holds particular promise in boosting productivity. The more sunlight absorbed by the plant, the faster photosynthate is produced and the greater the plant growth rate. Physical changes in plants can improve their ability to absorb sunlight. For example, growth regulators and hormones can be used to change the structure of a plant so that more leaf area is exposed to the Sun. New varieties of barley, wheat, and corn that are capable of intercepting more sunlight have already been developed.

A concentrated research effort is also needed to identify and define areas and methodologies to use our knowledge of DNA and its potentials for advances in the crop sciences and technologies. For example, genetic modification of cereal grain plants so that they are able to fix their own nitrogen would sharply reduce total energy requirements and costs of production, and would reduce the threat of environmental pollution from heavy applications of nitrogen fertilizers to cropland.

B. Animal productivity

The production of animals and animal products on farms represents at least one half of the total value of farm products. Animals and animal products, including poultry, supply many of the nutrients consumed by man. Grazing animals convert plant materials that would not otherwise enter the food chain into food for humans. Research and education on animal protection and production is essential to the continuation of the plentiful and economical supply of animal foods that the American consumer desires and enjoys.

A number of our problems in animal reproduction, genetics, nutrition and disease control, are particularly complex and will be difficult to solve. At the same time there are areas that seem especially promising and that could have important impacts on production efficiency.

For example, we are learning how to obtain and transfer embryos on a routine basis in cattle, and the process now needs to be improved and extended to other animals.

Control of the sex ratio and the number of offspring born may be possible within this decade if research progress continues. If each beef cow could be induced to give birth to twin male calves, pro-

ductivity and profitability in the cow-calf business could be more than doubled. So would a rancher's ability to respond to changes in supply and demand.

We need to continue to improve our ability to evaluate early the genetic worth of animals and to maximize the use of superior germ plasm in animal breeding.

We need new vaccines and methods to control or eradicate disease—methods without environmental side effects. We must apply the genetic engineering of micro-organisms—gene splicing, mutation, and selection—in ways to attack livestock problems more effectively. The work underway now in developing a safe, effective, and inexpensive vaccine for foot-and-mouth disease through recombinant DNA techniques is an example. Many other possibilities lie ahead—genetic control of the animal's immune response to protect it from diseases and parasites, and genetic sterility for the pests, to name just two.

C. Pest management systems

Evidence of adverse effects of chemical pesticides have resulted in increasingly stringent constraints on their use. Given the magnitude of pest problems, research is urgently needed to advance environmentally safe and effective plant pesticide management strategies for a wide variety of commercial crops.

Scientifically designed integrated pest management (IPM) systems can help assure reliable long-term high productivity of farms and forests by slowing the development of resistant pests (which now number more than 460 species) and by preventing pests from developing biotypes that can overcome the genes for resistance bred into crops and livestock. In many cases, IPM will entail much greater reliance on biological control agents. All components of the system must be complementary with, and maximize the effectiveness of, biological control agents that exist in nature—such as parasites or predators that prey on the target pests. Some of these approaches currently exist, such as plant, insect, and nematode pathogens; pest-resistant plants; insect attractants, and cultural and mechanical methods for disease, insect, nematode, and weed control.

Thus, environmental concerns emphasize the need for integrated management systems to reduce losses caused by pests, reduce costs of pest control and other production practices, reduce environmental damage from pesticides and fertilizers and maintain profitability of production from superior crop management systems. The development of IPM has the potential for a large social return through environmentally safe and effective plant pest management strategies for a wide variety of commercial crops, and must be vigorously pursued.

D. Beyond the farm gate

We also know that agricultural efficiency does not stop at the farm gate. It extends into the marketplace—whether the processing plant, the supermarket, the roadside stand, the home, the restaurant, the fast food shop—wherever farm products are ultimately used. It means maintaining the quality and safety of products after they leave the farm. It means better methods of handling, processing, and distribu-

tion. And it means better utilization of all agricultural commodities—whether as industrial raw materials or as consumer end products.

IV. ECOLOGICAL CONCERNs

The great awakening of ecological consciousness that we have seen in the 1960's and 1970's is beginning to be matched with a realization of the true cost of cleaning up the environment—as well as the cost of not cleaning up the environment.

We must recognize that we have environmental problems caused by the way agriculture has functioned in the past. We have used pesticides and other chemicals to excess in some places; we have adversely affected the health of our neighbors by careless application methods; we have permitted excess erosion into our streams and lakes. All of this I might add took place while we were in the process of developing the most wholesome and abundant food supply in the world.

Agriculture has needed time to make adjustments to a less polluting mode of operation; time to make adjustments based on research findings that take into account all of the consequences and changes, including economic and social impacts.

However, the scenario is already set throughout our environment for conditions that will only get worse unless we plan intelligently on ways to deal with them.

Fluctuating weather patterns, drought, increasing desertification of the world's grazing lands, oil import problems, the gravity of the world food situation, increasing and competing needs, the finiteness of our land and water resources, and the impact of overuse and erosion of our lands on the environment, all influence the outlook for the future of our natural resources.

As the better land in some areas is removed from the agricultural base and farmers are forced to use less desirable land, the chances of environmental pollution, through erosion, for example, increases. We must develop farming practices to utilize the less-than-prime land more efficiently in the production of food and fiber. Before we can develop the technology we need, we must have more basic knowledge on the chemical and physical properties of soils.

A potentially very significant factor in soil conservation efforts is research that will permit extension of conservation tillage onto land where it cannot now be successfully practiced—for example on cold, wet soils. To reduce erosion significantly we must at least double the acreage on which conservation tillage is practiced.

Research is critically needed in a number of other areas as well. Nonpoint pollution control is another example. The task is staggering when we consider the sheer amount of land involved and all the variables of soils, crops, cultural practices, weather, and so on.

We need to develop models to help us predict the effect of various management practices on soil erosion, on transport of agricultural chemicals and on water quality, taking into account the total environment, the flora and fauna, soil characteristics, the cultural practices, and the methods of water application.

A tremendous data base is necessary so that scientifically sound decisions can be made. The problems are of such magnitude that it

will take the best efforts of all of us. Cooperative efforts are essential if we are to get the job done. Information on and techniques for, safely recycling industrial wastes and municipal sludges and effluents must also be developed. Legislation has mandated that we deal with these environmental problems, and it is to the best interest of every part of agriculture that we do so.

Dwindling supplies are fast making fresh water the limiting factor in food and fiber production. Some agricultural areas, now mining ground water, will run out of water for agriculture in the 1980's. There are opportunities through science and technology to develop management practices for utilizing water more efficiently. These practices include new distribution systems, irrigation scheduling, and recycling of waste water.

Science and technology can also assist in developing water-conserving farming practices, including plant varieties that require less water.

At the interface between water issues and agricultural productivity issues, there is a need for technical information on the fate and pathways of chemicals in the soil and associated water. With current and projected plant nutrient prices, data are not adequate for developing economically sound fertilizer rate and soil management recommendations. At the same time, water quality is difficult to predict. More basic research is needed to develop proven technical information of chemicals in the soils and associated ground water. A most pressing need is improved knowledge of nutrient cycling, especially nitrogen.

As the Nation moves to greater dependence on coal as an energy source, the acidity of precipitation is expected to increase, thereby potentially inhibiting increases in agricultural productivity by introducing yet another stress on plants, especially forests. We will have to have a better understanding than we do now of the extent and nature of acid rain and its effect on biological systems if sound decisions are to be made regarding regulatory controls for emissions and on agricultural efforts to ameliorate the effects of acid rain.

Other problems on our research agenda for the 1980's involve our range and forest resources. The harvesting of range forage by grazing livestock, for example, is likely to increase because it is one of the least energy-intensive forms of agriculture available, but what will be the environmental consequences? We know that in the Western United States 350 million acres of arid and semiarid lands have vegetative and soil conditions now that are at, or less than, 40 percent of their environmental potential, while population growth in these areas is much higher than average. Recent estimates indicate that 54 percent of the range in the 48 contiguous States is already in unsatisfactory condition and some areas are in high risk of decertification.

As for our forest resources, during the past year we have seen a geometric increase in the use of wood to heat homes and provide fuel for small electric utilities and industries that are primarily wood-related. The Department of Energy has identified wood combustion as an area ready for commercialization. We have a real challenge here to see that these valuable forestry resources are used wisely and to their full potential. We must also expand our timber supplies through

a better understanding of the dynamic nature of forests, through genetic improvement of our trees, and through other sound management practices.

V. ENERGY

Our agriculture's productivity has been based in the past several decades on increasing amounts of external inputs of chemicals, machinery, fossil fuels and research results. All of these externally generated inputs are in jeopardy.

As far as energy is concerned, it may be possible for agriculture to obtain enough energy resources for some time to come, but costs will be higher in terms of both money and environmental degradation. This is bound to force increasingly significant changes in agriculture—changes we must try to anticipate and deal with.

The Department of Agriculture has set the goal of making American agriculture net energy self-sufficient by the end of this decade. The overall plan encompasses three major areas that include deriving energy from as well as conserving it for agriculture:

a. Energy conservation and management in production, processing, and distribution. Research and education can play a major part here in such areas as reduced tillage; improved irrigation efficiency; crop drying techniques; increased efficiency in use of fertilizer by better soil testing; efficient use of forage by ruminants; and changes in marketing procedures to reduce fuel requirements for the distribution of agricultural products.

b. Development of new renewable crop sources of plant-derived hydrocarbons, and the use of biomass from field and forest through their conversion to methane, ethanol, or other usable fuels and chemical feedstocks. We see this as progressing in two ways—through commercial plants that would produce anhydrous alcohol for general use in gasohol and through small-scale, on-the-farm production of alcohol.

Methane produced by anaerobic digestion is another biomass energy source of particular interest to agriculture because of the potential for converting feedlot wastes to methane for energy use.

Methane extracted from coal beds is also of interest to agriculture because of its wide availability in rural areas.

c. Utilization of alternate energy sources such as solar and wind energy, and

d. Providing economic assessments of energy alternatives in agriculture and making it a special responsibility of research and education in agriculture to consider incentives that will foster adoption.

VI. CLIENTELE CONCERNs

In the years ahead it will be increasingly necessary for us to pay more attention to the process of identifying problems, setting research priorities, defining the research to be done, and selecting the most appropriate mechanism for conducting and supporting the research.

There will be an increasing emphasis on the quality of the research conducted and on the adequacy of quality control mechanisms. Research will need to be increasingly efficient. Like agriculture itself, it will be necessary to increase research productivity within the con-

straints of competition for resources. We must improve communications among all elements of the agriculture research community, and strengthen the partnerships which characterize the agricultural research enterprise.

While there is still generally a strong belief in this country that there are net social gains from technological advances, there is a real need to anticipate the distributional impacts of each major new technology under consideration. Economists and social scientists are needed increasingly in the ranks of multidisciplinary teams to evaluate the differential impacts of new technologies before they are adopted, or when new technologies are projected but before they are adopted.

Another important function of research is, and will be, to provide research backup for action and regulatory agencies to help make the processes work better for all concerned. For example, such research can help regulatory methodology keep pace with food product and processing changes; take advantage of new analytical approaches; and improve the reliability, ease, speed, accuracy and versatility in monitoring the quality and safety of our food supply. We also need improved technology to identify the source of problems and to track the success of measures taken to alleviate them. The success we are having with sulfonamides in pork is an example. We can profitably aim more research efforts at helping improve regulatory actions in the 1980's or making them unnecessary by eliminating the problem they are designed to control.

Interest in the relationship between our diet and long-term well-being will continue and increase. Major thrusts will be directed toward critical areas of human health and well-being at the differing stages of life. For example, we need to know more specifically the nutritional needs of pregnant and lactating women; of infants and young children; of the elderly. More effort is also needed on the effects of nutrition on mental and physical development; on the impact of intervention programs upon nutrition status; and on improving methodology in every area of nutrition research.

In the biomedical and behavioral sciences, we need to assess the consequences of nutrient intake, and to investigate the metabolic and behavioral mechanisms involved in nutrient intake as well as the consequences.

In the food sciences, we will be primarily concerned with the nutritional quality, content, or composition of foods, and with the bioavailability of nutrients in foods.

In nutrition education we want to focus on studies of dietary practices, food consumption patterns, determinants of these practices and patterns, and on methods for informing and educating the public about nutrition health and dietary practices. We also need special efforts to bring nutrition research findings to the scientific and technical community.

VII. THE NEW INFORMATION TECHNOLOGY

We see the technology of computers and telecommunications and office automation influencing our daily lives more and more, and the momentum is increasing.

The new information technology—new ways of generating information, handling it, storing it, retrieving it, communicating it and using it—has also transformed the way we do science and will become even more critical in the future.

For example, we have on-line data systems gathering and dispensing information around the world on an interactive, live basis; and we have duplication of effort in building and utilizing these systems. One of the greatest challenges facing our food and agricultural research system is the development of logical and cohesive information systems with protocols that will meet the many and diverse needs of our cooperators and clientele.

We face serious problems in information overload. We are generating information faster than we can assimilate it. The rate of technological development has been so fast that many of the benefits go undefined in the next wave of innovation.

We have barely scratched the surface in the use of these powerful tools in agricultural research, development, and education. We must master their use and do it soon.

Of course, the best and most ingenious and creative research will be of use only if its results are communicated to users—other scientists and the public clientele—and if this is done rapidly to reduce the timelag before application. Among science-related problems of national significance, one of the more important is using scientific and technical information quickly for societal problemsolving. We must develop data bases and effective information delivery systems in the food and agricultural sciences and encourage their effective use in coordinating, planning, and implementing research, extension, and teaching programs.

VIII. BASIC RESEARCH

Before we can make the really dramatic improvements needed in agricultural productivity, in loss reduction, in energy use and generation, we must have more fundamental knowledge from which to launch new development efforts. We are lagging seriously in replenishing our store of basic information. We are lagging both in effort expended on basic research and in the transfer to the applied stage.

We know that it is the pool of basic knowledge that sets the foundation and limits of applied and developmental research, which in turn can be translated into technologies for application and use. We know that many costly and inefficient applied efforts can be avoided if sufficient effort is devoted to generating new knowledge through basic research. Increased basic research is a big priority for the 1980's.

The plain fact is that we do not know enough today to be able to increase significantly the efficiency of food production, preservation, processing and usage. Without planned and accelerated basic research efforts and some major breakthroughs, the rate of growth of our food crops and animal production will not keep pace with needs.

Nowhere is there more exciting promise for us than along the whole broad frontier of genetics—in both plant and animal agriculture. We know that a better understanding of the mechanisms and functions of living cells means advances all across the food and agricultural sciences; increasing our ability to develop more produc-

tive, higher quality crops and livestock; to control diseases and pests; to maintain the quality of our farm products all through the marketing process; to preserve and enhance our environment; to make better use of our energy resources; and to improve the nutritional well-being of all our people.

We know that to increase plant production we must develop plants that are more photosynthetically efficient—and to create such plants requires knowledge we don't have. We must learn more about the mechanisms of photosynthetic conversion and carbon fixation, about processes which directly control the utilization of photosynthetic products, and about the control mechanisms which specifically influence the maintenance of chloroplasts.

Some recent work on photorespiration is an example of the kind of pioneering work I'm talking about. In trying to eliminate the energy-wasteful process of photorespiration, scientists have created plant strains in which photorespiration has been turned into a lethal characteristic. These genetically altered plants now survive only in a laboratory of enriched carbon dioxide. If we can succeed in developing offspring of these plants that will survive in normal air, the implications are astounding. The elimination of photorespiration could increase photosynthesis and biomass production by 45 percent in most crop plants. Think of the possibilities for making soybeans, wheat, beets, and alfalfa as productive as sugarcane, corn, and sorghum.

The possibilities are great for basic research in animal agriculture as well. More work is needed at the cellular level and we need to get started on attempts to find ways of utilizing genetic engineering techniques in livestock. The cell and its genetic machinery is vital to every process important in animal production. We must probe it deeper than we have in the past.

Other basic research areas needing more attention include physiological and biochemical factors and their relation to diet; the effects of nutrient availability on regulation of cell differentiation, growth, and function; hormone/enzyme effects in reproduction and growth; micronutrient effects on gene expression; the relationships of nutrients to membrane structure and function; the role of cell-mediated immune responses; and the genetic control of fat distribution. All of these areas are important and can contribute valuable, much-needed information.

The base of fundamental knowledge from which most of us in science are working today is not very great. It is, in fact, a very thin foundation.

I don't believe that the general public—whose human needs are in the forefront in setting our priorities—has the slightest idea of how precarious our position is or what it takes to make significant progress.

A good illustration of this can be seen in the accomplishments that are now being reported on work with recombinant DNA. From many of the press accounts, it would seem that these accomplishments were pulled from a hat just yesterday and that their promise today will be reality tomorrow. But as Lewis Thomas put it so well in one of his columns earlier this year:

These things had their beginnings in lines of work so far removed from today's enterprises that it is already difficult to track back through the network of experiments to find the beginnings. * * * Recombinant DNA techniques could

not have evolved without the 30-year background of research in virology and molecular genetics—almost all of it done without the faintest inkling that anything like recombinant DNA lay ahead.²

Thomas also points out the stake that private industry has in basic research and the need for more stable funding of such long-term work. The comments are pertinent for Federal and university researchers who are operating in a climate of extremely tight budgets and accountability, where basic work must compete with quick payoffs and defensive research.

With this review, one can easily see that problems of population, energy, and our environment will with certainty be influencing the future of the world's and the Nation's food supply in the decade ahead.

Our research agenda is being set now for the required advances in the sciences that undergird agriculture and for the ensuing technology that will be needed under the different and more difficult conditions that lie ahead. It will take time, effort, and resources to do the job, but by the time this decade is over we may well have passed the point where they are as important as is the decision to commit ourselves to the task today.

² "Notes of a Biology Watcher; On Science Business," *New England Journal of Medicine*, vol. 302, No. 3, pp. 157-8. Jan. 17, 1980.

RESOURCE CONSERVATION ISSUES FOR THE EIGHTIES

(By Sandra S. Batie, Senior Associate, The Conservation Foundation)

Dr. Bertrand began his presentation by stating that never before have we so clearly been able to see the challenges that lie ahead of us—and that the challenge is to increase our ability to produce food and fiber in a manner that is compatible with so many competing interests. Dr. Bayley's paper followed, then, by looking at three resource conservation issues of the 1980's: farmland retention, ground water mining for irrigation, and soil erosion.

While these are not the only issues in resource conservation in the 1980's, it is true that we can at least develop a list of issues with, as Bertrand suggests, clarity and ease. But I disagree that the challenge will be to increase our food and fiber in a manner that is compatible with competing interests. Indeed, the challenge will come from the very fact that many of the objectives and beliefs we have as a society are not compatible—they are in conflict. Thus, the challenge ahead will be how to resolve the conflicts resulting when we as a Nation try to achieve simultaneously held, and worthwhile objectives. How can we, as a Nation, be firmly committed to the aggressive expansion of agricultural exports, as President-elect Reagan has promised . . . while still achieving nondegradation of soil resources? While reducing ground water withdrawals? While improving wildlife habitat? How can we meet energy production goals with gasohol or meet soil conservation goals—while still keeping retail food prices low for the consumer? How can we develop lands for recreational uses—while still protecting lands for wildlife uses? While still developing mineral, gas, and petroleum deposits? How can we protect the individual rights to make decisions with respect to private property—while still protecting the right of future generations to inherit a productive resource base? We, as a Nation, unfortunately, cannot obtain all goals that we might reasonably desire. As one wit stated, not only is there no such thing as a free lunch, it seems there is not even such a thing as a cheap lunch. We cannot vigorously expand exports, protect environmental quality, keep production costs low, and still provide consumers with low-cost food and reduced taxes.

Thus, while stating national objectives for, say, water conservation, as that of "minimizing irrigation water use" probably does no harm, it also gives no guidance. Minimizing irrigation use, in the extreme, means no irrigation at all, and therefore significant declines in production from arid lands. Obviously few favor this, but the objective as written does not suggest what tradeoffs are desirable.

This perspective of difficult choices seem to be missing from the papers, although I have no doubt that both Drs. Bayley and Bertrand are painfully aware of their existence.

What is present, at least in Dr. Bayley's presentation, is the concern that we have reached the age of limits—and that we may be literally running short of farmland, soil, and water. The statistics he cites are those commonly quoted. There is encapsulated in these data a rationale for action—for public policies. But others have looked at this same set of data and come away with different conclusions. Thus, some plead the case of "this really is a credible crisis"; others suggest that all is well—their fear is the harm done by policies designed with good intentions.

If the same set of data leads to differing hypotheses and conclusions, what can be said concerning public policies with respect to resource conservation?

Surely, all the answers are not known. But there is room for what one author has termed good policy analysis:

Good policy analysis recognizes that physical truth may be poorly or incompletely known. Its objective is to evaluate, order, and structure incomplete knowledge so as to allow decisions to be made with as complete an understanding as possible of the current state of knowledge, its limitations, and its implications. Like good science, good policy analysis does not draw hard conclusions unless they are warranted by unambiguous data or well-founded theoretical insight. Unlike good science, good policy analysis must deal with opinions, preferences, and values, but it does so in ways that are open and explicit and that allow different people, with different opinions and values, to use the same analysis as an aid in making their own decisions. (Morgan, 1978)

Such a statement might seem to be simply academic semantics—meaningless in the political world that appears to thrive on advocacy analysis—and not policy analysis. But I am not talking about the importance of knowing what it is we are accomplishing.

In good policy analysis not only is the question of "why" considered—for instance, "why retain farmland" or "why reduce soil erosion"—but also the questions of how much, at what price, where, how, by whom, and who should pay the costs. I think these are the real issues of resources in the 1980's. I expect that Dr. Bayley agrees. But his paper does lay out the current alternative plans for implementing the Resource Conservation Act without squarely addressing these questions. In so doing, I think he has abstracted from some of the complexities of the issues.

For example, noticeably absent from Dr. Bayley's list of strategies for soil loss reduction are those controversial techniques which penalize the farmer for erosion—which remove some of the property rights to erode land. But there are those who argue that the farmer should be expected to exhibit more social responsibility with respect to erosion reduction, and that consideration should be given to selected regulation, cross-compliance, or long-term compliance for cost-sharing privileges. The impacts on farm size, farm income, consumer prices, and soil loss reduction of "penalizing" techniques are worthy of analysis, and they will be issues of the 1980's.

For another example, in many ground water aquifers, recharge is so slow as to suggest ground water is in reality similar to a coal mine. The question is not whether they should be mined * * * but rather how fast they should be mined and for what purposes—agricultural, energy development and/or urban uses. This will be an issue of the 1980's.

In a third example, it appears the United States has paid a high environmental price for agricultural expansion. The farming of more acres has increased soil erosion, led to the draining of inland wetlands, and the uprooting of shelter belts that formerly reduced wind erosion and provided wildlife habitat. The mining of aquifers has caused land subsidence in some areas and saltwater intrusion in others. As the public becomes aware of the environmental and resource problems associated with our agriculture, reconciling production expansion goals with conservation goals seem destined to be a major task of the 1980's.

My own opinion of some of the resource issues is that many decisions concerning resource management will have to be made with high levels of uncertainty as to the probable future outcomes. While uncertainty suggests possible benefits from insurance against unwanted outcomes, and the need for maintaining options * * * insurance and flexibility are not without costs. What costs are worth bearing and who should bear these costs will be issues of the 1980's. While Dr. Bayley did not highlight these costs, I know he is sympathetic to my argument, for he stated in his conclusion :

If we can learn to understand and settle on the tradeoffs that must be made among values and concerns, * * * we can enhance the quality of life.

I agree: this is the resource conservation issue of the 1980's.

REFERENCE

Morgan, M. Granger. "Bad Science and Good Policy Analysis," Science vol. 201, No. 4360, Sept. 15, 1978.

FOOD AND AGRICULTURAL RESEARCH AGENDA¹

(By Don Paarlberg, Professor Emeritus, Purdue University)

Dr. Bertrand's paper is comprehensive and well-balanced. It shows full awareness of the many new frontiers of agricultural knowledge. A broadening of concerns is evident in the paper; Dr. Bertrand recognizes the good and bad side-effects of new agricultural technology. The social sciences, sometimes excluded in papers of this kind, are acknowledged as rightful participants in the agenda-making process.

What is missing is a series of subjects which Dr. Bertrand no doubt deliberately excluded as being inappropriate for this group. Nevertheless, the omitted subjects are ones in which we in this audience have profound interests: How are priorities to be established? How is the research agenda to be funded? Who will coordinate this undertaking? What will be the respective roles of the Department of Agriculture and the experiment stations? Dr. Bertrand's paper gives encouragement to every researcher in every discipline, and avoids the contentious questions. Despite the title to his paper, what Dr. Bertrand has given us is not really an agenda; it is a wish list.

I propose to lift up questions which do not appear in Dr. Bertrand's paper and consider them briefly.

1. How are priorities to be established?

Surely the changing agricultural setting which Dr. Bertrand describes calls for changing emphasis in research. Some priorities must be lifted up. Requests for across-the-board increases for each of the disciplines will not be convincing to the appropriations committees. In fact, this is what has turned them off in the past. Across-the-board requests for increased funds appear to the appropriations committees more as a defense of the research bureaucracy than as an earnest effort to solve the problems of agriculture. How are priorities to be determined? Who will tell the researchers in the disfavored disciplines that their work is to be deemphasized? The credibility of the research effort can be established only if leadership will assume these difficult tasks.

2. How are funds to be obtained?

There has been a transformation on the funding of agricultural research. Ruttan shows that, since 1960, Federal formula (Hatch) support for the State agricultural experiment stations has been virtually stagnant at about 50 million 1967 dollars. Meanwhile, total Federal appropriations for agricultural research, including Federal agencies such as the National Institutes of Health, National Science Foundation, and the Environmental Protection Agency, have risen from about \$150 to \$250 million, also in 1967 terms. Appropriations for ag-

¹ "Food and Agricultural Research Agenda" by Dr. Anson R. Bertrand is discussed by Don Paarlberg.

gricultural research, administered through these agencies, now exceed the Federal funds available to the State experiment stations by a factor of five.

What are the reasons for this shift? Why are the new increments of Federal funding going to these new agencies? Modern agricultural research tends to be mission oriented and multidisciplinary, involving the commitment of very large sums over long periods of time. The discovery of new knowledge doesn't come easily, in small packages suited to the granting of a Ph. D. in a particular discipline, as it once did. To the land grant colleges, geared as they long have been to the development of agricultural scientists, this is a disquieting fact. They have not organized themselves to combine well in a modern setting the two functions of developing agricultural scientists and discovering new knowledge. It may be that to obtain increased Federal support for the experiment stations, something more is required than a greater lobbying effort. Research methods may need review. In my field, agricultural economics, our models sometimes increase in rigor while they decrease in predictive ability. These problems are complicated by the current mood to restrain Federal expenditures.

3. Who will coordinate the research effort?

The need for some degree of relatedness in the various agricultural research undertakings is clear.

The agricultural experiment stations are perhaps unique among the tax-supported research institutions. They were set up nearly a century ago, when the prevailing mood was more individualistic than it has recently become. Modern macro concepts had not been invented. The States were more important then. Central direction was anathema. Volunteerism and cooperation were in vogue. The experiment stations reflected their times. Traditionally, decisionmaking was shared among the clientele groups, the individual researcher, his department head, his director of research, his dean, the university president, the State legislature, and the Congress. With formula funding the Department of Agriculture had limited input.

The recent surge of tax-supported research in fields other than agriculture and in agencies other than the experiment stations is the product of different times: More central direction, more team activity, more macro and less micro, more concern about externalities, less emphasis on the criterion long used by the land grant colleges—efficiency.

There is now an effort, on the part of those who provide the Federal funds, to bring the experiment stations and agricultural research generally into the modern setting, with more central direction, to have it conform to the current mood. The experiment stations, with their proud history, understandably resist this effort.

Some form of leadership is essential. Strong central direction and coercion are repugnant for a number of good reasons. A loose voluntary cooperative type of guidance is desirable. The accepted though much scorned word for this is coordination. It must be exercised if the research community is to appear to the appropriations committees as something other than a group of bureaucratic self-seekers. Who should

supply this coordination? In my view, the Science and Education Administration of the Department of Agriculture should exercise the coordinating role, with input from the directors of research at the experiment stations and other institutions with research capability in agriculture. The Department of Agriculture is central, it is directly involved in the acquisition and distribution of Federal funds, and it comes closer to perceiving the broad public interest than does any other unit in the system. The exercise of this role is extremely difficult. An experienced administrator will take on this role with some reluctance, as an exercise of responsibility, not assertively, as an expression of power.

Neither the Department of Agriculture nor any other Federal agency should undertake to coordinate or supervise research done by the experiment stations with State and privately supplied funds, which funds are about four times as great as the Federal input. There is no basis for the belief of some people in Washington, that with an input of \$1 they should be able to influence the expenditure of \$5.

I conclude with this comment. When the land grant college system was set up farmers totaled 59 percent of the population. The farm population has fallen so that it presently equals 2.8 percent of the total. And it is still declining. There may have been a time when quarrels between the various sectors of agriculture could be indulged. Not so at present, nor prospectively. This is not a time to divide the remnant; it is a time to stitch together a patchwork quilt. And it will have to be a quilt suited to the needs of today and tomorrow, not of yesterday. Only then will we be able to permit and obtain the resources needed to do the job that Dr. Bertrand so persuasively outlines for us.

THE 1981 FOOD AND AGRICULTURE LEGISLATION

(By J. B. Penn, Deputy Administrator for Economics, Economics and Statistics Service, U.S. Department of Agriculture)

INTRODUCTION

Early next year, the 97th Congress will begin the quadrennial ritual of writing a new "farm bill." The present legislation, the Food and Agriculture Act of 1977, expires with the harvest of the 1981 crops. Much more than just a "farm bill," the 1977 act is truly omnibus legislation, containing 19 broad titles encompassing most of the major public farm and food programs. Specifically, the authorizations expiring with the act include: The farm commodity programs (wheat, feed grains, cotton, soybeans, rice, peanuts, sugar, the dairy price support minimum level, and wool and mohair); the dairy and beekeeper indemnity programs; grain reserves; Public Law 480 programs, the food stamp program; rural development and conservation; and a variety of miscellaneous programs. (Research, extension and teaching funding expires in 1982, but may be considered in 1981.)

The 1977 legislation expires at a time when there is much uncertainty about the future economic environment for agriculture and when there will be many new participants in both the executive and legislative branches. This paper discusses this setting in which the new legislation will be developed and the issues that are likely to be considered.

CURRENT UNCERTAINTIES

The specific course of development and content that will characterize a new farm bill is presently shrouded in more than the usual uncertainty. This uncertainty derives from both the current political setting resulting from the recent national elections and the future economic environment for agriculture.

First, there will be a new administration, with the appointees who will be influential in determining future policy directions still unnamed at this time. While the party platform and a few campaign speeches provide some outline of the general policy directions the new administration may pursue, specific positions on major areas of the bill remain to be determined.

Second, the national election will bring significant changes in the composition and leadership of the Congress. These changes will be reflected in the agricultural committees, especially on the Senate side. Republican control of the Senate in the 97th Congress means the leadership of the Committee on Agriculture, Nutrition, and Forestry will change. The ranking Republican member, Senator Jesse Helms (North Carolina), is expected to become chairman of the committee, and Republicans will chair the subcommittees.

The Senate committee will largely be a new entity. Only 6 of the 18 members of the present committee were serving when the 1973 Farm Act was passed. Three of those six were defeated in their re-election bid (Talmadge and McGovern) or retired (Young), and two of the newer members were also defeated (Stone and Stewart). There will thus be at least five new members to be seated, making it possible that only three members of the new committee will have served through the writing of two farm bills and only eight will have been on the committee when the 1977 act was developed.

Changes in the House committee are unlikely to be as substantial. The Democratic leadership will change only slightly (unless, of course, Chairman Tom Foley (Democrat of Washington) moves to another post). Eight of the present fifty-two members either not reelected or retiring include three Democratic subcommittee chairmen: Baldus (Wisconsin)—Dairy; Mathis (Georgia)—Oilseeds and Rice; and Nolan (Minnesota)—Family Farms. Of the five departing House Republicans, two (Symms of Idaho and Grassley of Iowa) will be moving to the Senate. The House committee membership will be realigned to reflect the membership of the House as a whole and the size could be changed, but the changes will likely be less wholesale than in the Senate committee.

The time path for writing the new legislation is largely dictated by the congressional budget process. The important dates including those required by the Budget Act are:

January 3: The 97th Congress convenes and begins to organize itself.

January 20: The President-elect is inaugurated; Senate confirmation hearings are conducted and new Cabinet officers sworn in.

February–March: Both Houses hold public hearings on the new legislation.

Mid-March: An administration bill, if there is one, must be submitted to the Congress to receive consideration.

Mid-March–May 15: Committee markup and bill provisions adopted.

May 15: Bills reported from committees to both Houses—first concurrent budget resolution adopted.

May 15–September 15: Bills considered and passed by both Houses, the conference committee completed, and enrolled bill sent to the White House.

September 1: Second concurrent budget resolution passed.

This schedule obviously means that development must move rather quickly. One immediate decision the new administration faces is how it will elect to make its input into the legislative process. The administration's options pertaining to the new legislation include:

Writing its own bill for consideration by the Congress along with other proposed bills. This option places the greatest burden on the new administration simply because so little time is available for it to get organized and then write a bill;

Working with the congressional committees in getting its preferred positions included in a committee-written bill; and

Of course, the new administration could request a 1-year extension of the present law (perhaps with minor modifications) to provide time for developing positions and writing a bill.

There is no indication at this time as to which option the new administration might prefer. However, simple pragmatism would suggest a higher probability for either of the latter two.

Another major uncertainty at this time is the economic environment through the mideighties in which the new farm law will have to operate. An increasing number of analysts today are suggesting the future economic conditions for the farm sector will be essentially the opposite of those to which we have grown accustomed over the past 50 years of farm programs. These forecasts suggest that rather than overproduction, chronic surpluses, and low commodity prices and farm incomes, the typical conditions could well be frequent shortages, highly volatile prices, and unstable farm incomes. The policy concerns would then be allocation of available supplies between domestic and foreign consumers, encouraging production, wise use of production resources, and economic stability. Traditionally, national farm policies have tended to follow economic conditions rather than lead them. But, if these prognostications are to be believed, then the policy provisions meriting most attention for inclusion in the farm bill may well be quite different from those that have traditionally received the attention.

THE ISSUES

Regardless of whom the new policy officials will be, how the new administration makes its input, or the conclusion about the future economic environment, there are numerous issues which are almost certain to arise as the new legislation is framed.

The commodity programs

One of the most difficult issues in fashioning the commodity programs is the structure and level of the price and income supports (the loan rates and target prices). The search for an acceptable way to determine these has continued since passage of the 1977 act, with legislative changes in 1978, 1979, and early 1980.

Target prices.—The base levels established in the 1977 act were reached only after considerable debate and compromise. The act also included a year-to-year adjustment formula which incorporated changes in variable, machinery ownership, and overhead components of production costs. This was subsequently modified and now the annual target prices are determined by the Secretary after taking into account changes in production costs.

It is likely that target prices will again be a major issue. The debate will focus on the target price levels and the components of production costs on which to base and adjust them. It appears to be rather widely accepted that cost of production should be retained as the basis for setting target prices. But there is much less consensus on which cost components to include or which yields (trend, some average of actual yields, et cetera) to use in determining unit costs, or whether to use historical or prospective costs. In addition, we will see arguments for the target prices to be tied to total costs, including land.

There may be attempts to significantly change the target price system, and perhaps even proposals to scrap it altogether. The use of some type of regional support levels to account for the diversity in

yields and costs is frequently mentioned. Some people would now argue that target prices are redundant, that income support can be guaranteed using a combination of the loan and farmer-owned reserve programs. Elements of this argument include reducing program costs, neutralizing the impact of programs on farm structure, and, more fundamentally that the farm sector has evolved to the point where direct payments are no longer necessary.

Price supports.—Undoubtedly, this will again be an issue, as both the levels and methods of adjusting loan rates will be called into question. We will again see proposals for "high" price supports, perhaps to cover total cost of production, and questions of whether these should be adjusted by some formula (for example, indexed to costs) or left to administrative discretion. The same pro and con arguments will ensue, with budget outlays and maintaining competitiveness in world markets being the critical ones. It is possible that there could be a serious review of the respective roles of the commodity loan program and the target price concept, when operating in conjunction with the reserve program.

Payment limits.—This has been a provision of the law since 1970. Efforts will again be made to both reduce and to increase the limit. Proponents of a lower limit will argue that this would prevent distribution of unneeded benefits to larger farmers. Proponents of higher limits will site inflation as the principal need.

This whole argument really centers on the distribution of program benefits—who should benefit from the payments—and how it affects the structure of the farm sector. The present distribution of payments is highly skewed to the larger farmers, since payments are based on volume of production. This debate could produce proposals for more carefully targeting the payments, with suggestions such as variable payment schemes and variable limits emerging.

Acreage bases.—The 1977 act suspended the acreage allotments, replacing them with a normal cropland acreage (NCA). The views on the suitability of the NCA vary widely. Proposals for alteration are likely, focusing on the number and types of crops to be included, the means for annual adjustment, and the extent of allowed adjustments. Another question will be whether farmers should be required to keep plantings within the NCA as a condition for eligibility for program benefits. (NCA's were established on the basis of 1977 plantings—farmers could ask for adjustments based on 1975 and 1976 plantings. Because of production shifts, some states are having difficulty staying within their NCA in order to be in compliance. This is especially true in the Southeast, where farmers exceeded their 1980 NCA's by 7 million acres.)

Cross compliance also appears to be an issue—with some groups favoring retention and others complete elimination. Soybean farmers are most likely to oppose cross compliance, perhaps joined by cotton farmers. And, some support might come from farmers on the "smaller, mixed operations."

Production controls.—Arguments have been advanced now for several years that we really no longer need production controls. But the statutory authority for them will likely be continued. The arguments may focus on the way in which need for production control is

determined. Some farm groups now suggest that the set-aside decisions are too political, and that they are simply no longer effective. Some consideration could be given to determining when to have a set-aside by some specific carryover stock level or other formula.

Grain reserves.—The role of grain reserves in farm policy may well mark the most fundamental differences among participants in the 1981 debate. There is still mixed opinion about the efficacy of the farmer-owned reserve. The reserve, however, is politically attractive and has rather wide support among farmers, consumers, and taxpayers. Major debate will likely ensue around the extent of its role among the policy tools, and the mechanics of its operation—its size, release prices, call prices, incentives to farmers to participate, and the amount of administrative discretion in operating the reserve. Issues may include:

Whether to specify limits on the size of the grain reserve and, if so, what the size should be.

Whether to broaden the reserve to include additional commodities such as soybeans and cotton.

The appropriate level for the reserve release and call prices and how to establish such levels. Proposals will likely emerge calling for a much higher release price, a staggered call price, regional release and call prices, and perhaps some linkage of these to cost of production.

Whether to institute a special loan price that is much higher than the regular loan rate for grain entering the reserve.

Other commodities.—There may be some efforts to modify the programs for specific commodities for various reasons. The substantial losses from the drought this year may engender a movement to include soybeans in the "total" program, specifically to make them eligible for disaster payments. Yet, the implementation of the new crop insurance program and whether the disaster payments program is extended will affect any such move. Soybean interests are likely to continue to oppose a reserve, set-aside, and target price while seeking expanded assistance for international marketing and yield related research.

Proposals may also be advanced to modify the rice program to make it more closely conform to the programs for the other grains and cotton.

Historic allotments continue to be used as the basis for target price payments. Suspending the allotments would extend program benefits to all producers, making the program consistent with the other grain commodity programs.

The prevalence of cooperative pooling has raised questions about price determinations for program purposes. Basing deficiency payments on a season average price has been argued by some as overcoming the problem.

The loan rate is directly tied to target price adjustments, unlike other grain commodities.

The reserve release level is viewed by some as being too low.

The high concentration of production has raised questions about the payment limit. Efforts may be made to close loopholes and perhaps reduce the payment limit.

There will undoubtedly be major efforts to revise and modify the programs for dairy, peanuts, tobacco, and sugar, to bring these pro-

grams into closer accord with current economic reality and the mainstream of policy. Issues related to these programs are treated elsewhere (see the paper by Bill Motes in this session) and will not be further discussed here.

Conservation.—The loss of soil due to water and wind erosion continues as a serious problem affecting the present and future productive capacity of our resource base and agricultural plant. Approximately 126 million acres of cropland are subject to losses of more than 5 tons of top soil annually; 63 million acres lose more than 10 tons annually. These acreages are 31 and 15 percent, respectively, of the 413 million acres of cropland identified by the 1977 National Resources Inventory of the Soil Conservation Service. Erosion is also a serious problem on much pasture and rangeland where approximately 81 million acres lose more than 5 tons annually.

A controversial issue is whether conservation programs and incentives should be linked to the commodity programs, especially whether cross compliance—the required adoption of conservation measures to gain eligibility for other program benefits—should be adopted. Related issues concern the types of economic incentives that should be made available to farmers to encourage conservation. Again, the amount of Government regulation—involvement—in the affairs of the farm business lies beneath this.

Other commodity issues.—A few other agriculture-related issues might receive some consideration. These include internal transportation of commodities, especially as related to movement for export. This involves principally the railroads but extends to the waterway and highway systems.

The export promotion programs are also likely to figure prominently. Especial consideration will undoubtedly be given to safeguards for farmers against trade disruptions such as embargoes for whatever reason. Further, the recent trade agreement with China and the upcoming expiration of U.S.-U.S.S.R. grains agreement raise questions about bilateral agreements—their desirability and the role of the Congress (such as having veto power) in developing them.

Public Law 480

The Public Law 480 food aid legislation has undergone a number of substantial changes over the past 4 years affecting both its general organization and its day-to-day operation. Program supporters and critics alike agree, however, that further major changes in the law are unlikely in 1981.

There are a number of developments possible in related areas that could affect the food aid programs. These include initiatives to establish an international food security reserve, to define the role of the newly created International Development Coordination Agency, and more generally to minimize Government program expenditures.

Debate on an international food security reserve will impact directly on the food aid program. Common to most of the food security reserve and domestic grain reserve proposals now pending before Congress is the recognition that there must be a direct link with the food aid program. Several of the proposals made to date have been linked directly to the 4 million tons of wheat accumulated during the Soviet

sales suspension and limit any reserve exclusively to humanitarian relief in developing countries. The size of any reserve and provisions for replenishing the reserve will also impact directly on the operation of the food aid program in periods of short supplies and high prices and on efforts to expand the program's planning horizon from 1 to possibly 3 to 5 years.

Given the general move toward more restrictive Federal and departmental budgets, program funding could become an issue. Funding for the past 4 years (fiscal 1977-80) has averaged \$1.2 billion and is set at a record \$1.4 billion for fiscal year 1981. Rising commodity prices, however, mean lower aid volume; and the products actually shipped in 1981 could slip to 5.2 million tons compared with the 5.7 million tons shipped in fiscal year 1980. An appropriation in the range of \$1.6 to \$1.7 billion would be required to insure fiscal year 1981 donations at the same volume as in fiscal year 1980.

The day-to-day operation of the program could be affected by changes in related legislation. Of particular concern is the relationship between USDA, the lead agency in administering the food aid program, and the new International Development Coordination Agency. Also, potentially of interest is the further refocusing of food aid toward humanitarian and developmental needs reflected in the agricultural committees' emphasis on the title III program, on a "needs" criteria for aid allocation, and on multiyear aid planning.

The food stamp program

The funding authorization for the food stamp program which now provides assistance to nearly 22 million people, making it the largest of the Federal public assistance programs, will expire on September 30, 1981. The outgoing administration was expected to propose only minor program changes. But, with a new administration and changed leadership in the Congress, proposals for major changes may be advanced and now meet with greater political acceptance.

The most major change to the program in recent years was the elimination of the purchase requirement in 1977. This feature was implemented in early 1979 and the number of participants rose from 15.5 million to the present 22 million. But, it is difficult to determine the unambiguous impact of that program change because economic conditions in 1979 and 1980 also influenced the program. Unemployment was rising, adding to the number of eligible participants while food costs were also rising, increasing the per-person benefit rates. The combination served to increase the program costs.

The rising program costs reached the funding cap, another program feature adopted in the 1977 farm bill. The cap was adopted as an attempt to control expenditures for this entitlement program (i.e., all qualifying individuals are entitled to benefits, regardless of number) and to exert pressure to reduce fraud and administrative costs. The cap had to be raised in fiscal 1979 by \$620 million, and the Food Stamp Amendments of 1980 raised the cap for fiscal year 1980 from \$6.19 to \$9.49 billion and for fiscal year 1981 from \$6.24 to \$9.74 billion. It appears quite likely that the Senate Committee, at least, will carefully scrutinize the program with an eye to significantly reducing its costs. Several of the amendments proposed in this Congress during

consideration of the funding cap will undoubtedly emerge again. Ranging from moderate changes to sweeping reform, these proposals include:

Reinstating the purchase requirement, perhaps with exemptions for a few select groups (such as households with members over age 60 or the blind or disabled).

Eliminating overlap of program benefits (for example, reducing food stamp benefits for households with children receiving federally subsidized school lunches).

Recouping of benefits from recipients eligible for aid during the first part of a year but whose annual income exceeds the eligibility limit.

Conversion of the food stamp program into a block grant system giving States more authority to determine how funds are spent.

Reexamining the special deductions now allowed. Reducing the allowable deductions used in determining the net income level for eligibility would reduce the number of participants. Another approach, reducing the value of benefits (perhaps by raising the proportion of income which is subtracted from the cost of the thrifty food plan) would have the greatest dollar effect. Both such modifications would reduce program costs while still providing benefits to those most in need.

FOOD AND AGRICULTURE POLICY IN THE EIGHTIES

(By Carol Tucker Foreman, Assistant Secretary for Food and Consumer Services, U.S. Department of Agriculture)

We've been invited here today to discuss public or, if you will, Government agricultural policy in the eighties. After the program had gone to press, however, the voters went to the polls and we now address Federal Government policy in the context of a campaign in which all the major candidates promised to reduce inflation, primarily by reducing the size and cost of the Federal Government. The candidate who promised the most and was most convincing in this area won.

A visitor from outer space might wonder why, given the election results, a conference on public policy is being held at all. He might believe that there has been a mandate to stop having a role for Government in agriculture—to return to the simple days when everyone did for himself.

In fact, many who fret about Government's size and cost and role in our lives are yearning nostalgically for a time gone by—for the simple frontier life with John Wayne riding off into the sunset. They are troubled by the complexities of life in a world where television images and bombs can zip across the vast oceans that used to separate us from other nations. They are bothered that 220 million people now live, mostly close together, in a land that used to be primarily open spaces and everyone knew everyone else in town.

But the fact is that we live in a complicated, crowded world, in a technologically advanced society. We want order and services for that society, and in this country, we have joined together to provide them through a democratically elected government. The vast range of government programs didn't spring forth unbidden. They were developed to meet the expressed needs of the people. It is naive to believe that we can govern ourselves today with the same simple mechanisms used when we were a few hundred thousand folk, huddled in a clutch of colonies on the east coast.

Economist Milton Friedman and the Libertarians might like to do just that. But if our visitor from outer space argued that the election results were a mandate to get rid of the food stamp program, to do away with meat and poultry inspection, to dismantle the price support, market order, agricultural research and soil conservation programs, he would surely get a strong argument from at least one person in this room. Despite all the rhetoric about reducing government, all of us are protective of some government programs. We want to keep the ones that meet our needs and get rid of the ones that take care of the other guy.

Therefore, I think it is safe to tell our visitor that, despite the

election results, there will continue to be a sizable Federal Government role in food and agriculture in the decade of the eighties.

However, I do not believe the electorate was fooling on November 4, 1980, or even on November 2, 1976. I think the people believe, and with good cause, that government is not working as well as it could and should.

The question is can we develop a rational, equitable public policy in food and agriculture that works well and benefits the largest number of people possible.

Four years ago Secretary Bob Bergland stated that "we think this country must develop a policy around human nutrition, around which we build a food policy for this country and as much of the world as is interested. And in that framework we have to fashion a more rational farm policy. We've been going at it from the wrong end in the past."

Based on that statement, I made the suggestion at the 1978 conference that the goal of this policy would be to make available an adequate supply of safe, nutritious food at stable, reasonable prices—while providing a fair return on investment to farmers, processors and retailers, and decent wages to workers in the industry. The new policy would also be designed to provide for assistance to those at home and abroad who cannot afford the cost of a nutritious diet.

Some people were angered by these statements. Some professed to believe they signaled an end to concern with production policy. That was neither our history nor our intent. Long before coming to USDA, I had supported the notion that consumers should be willing to forgo the lowest possible price for a product in order to assure adequate production and avoid the out-of-control prices inherent in shortages.

Others resented the idea that agricultural policy could be shaped by any force other than the needs of those who grow food. But, of course, agricultural policy has frequently been influenced by the needs of a larger public, even when the rhetoric of agricultural politicians was not. The fortunes of food producers and food consumers have always been inextricably entwined.

Today, world events have coalesced to make sure that relationship will draw even closer. National and world demographics, combined with the Western economic crisis over energy, are quickly forcing agriculture policy into a new position of prominence and importance to all Americans. Agricultural policy and programs are likely to be subject in the future to closer scrutiny by a wider and wider range of people. Because farmers and their products are going to play a central role on the world stage, many more people will want in on the act.

THE FUNDAMENTAL PROBLEM OF PRICE

In the next several years, the one ineluctable force we must deal with will be the rising price of food. There are several reasons for this. There are few things on which demographers, economists and politicians agree, but they do agree there will be an increasing demand for food as the world population grows. That demand will be intensified by our dependence on foreign oil—both because it will continue to drive up the cost of producing food here at home and because our economic security will be at least partially dependent on our ability to pay for imported oil with foreign currency earnings.

Increased population growth and the distribution of wealth among nations have moral as well as public policy dimensions, but nothing can change the fact that real prices for food will continue to rise for the rest of this century. This will create enormous opportunities as well as basic policy problems. Rising prices should help farmers achieve some balance between energy-propelled increased production costs and their income. As the producer of almost half the world's corn, one-tenth of its wheat, and two-thirds of the world's soybeans, we are in a position to reap significant benefits during a period of expanding demand and rising prices. As one of the leading grain exporters, the United States will be in a strong position to utilize our comparative advantage in agriculture to balance our trade account. But because we are less likely than most to undertake direct government control over prices, at least in the short run, increasing demand for our food products is likely to bid up domestic prices drastically over the next 20 years. While our trade account may be better off, American food buyers will be worse off.

In 1945, Americans devoted about 35 percent of their total consumer expenditures to food. For the next 25 years, that percentage decreased steadily and stabilized at about 20 percent in the 1970's. Now we are facing the prospect of a period of major increases in the real price of food. For many Americans, that increase may be difficult to accept with equanimity, but the pain may be eased by an increase in real income. Americans who must live on fixed incomes, however, can anticipate spending larger and larger proportions of that income for food. For the poor, many of whom have difficulty even dealing with today's market, the tradeoff may be disastrous. The basic dilemma of agriculture policy in the 1980's will be to take full advantage of the rising demand for the products of American agriculture while mitigating the domestic distributional consequences of rising prices. I believe it is possible to outline a policy for the decade ahead. That policy has seven individual objectives that together should guide future food and agriculture program decisions—regardless of which party is in power.

THE SEVEN PRINCIPLES

The first principle is adequate food production which has always been the cornerstone of agriculture policy.—Over the past 50 years, the main problem has often been overproduction, and our agriculture attitudes and many of our programs are still dominated by that condition. But we have now reached a point where our productive capacities will be stretched to the limit, at least for the foreseeable future. A key element here is how we use our natural resources, which have blessed us with an enormous capacity for agricultural production.

We must guard against the temptation, as we rush headlong into the export market, to squander our comparative advantage by overburdening it. We must begin to give more policy attention to the long-run costs of all-out production and the use of resources in a way that enhances, rather than destroys, this strength. For the last 4 years, we have talked about valuing water and soil, for example, in ways that provide proper incentives to producers to use these resources in a more economical fashion. Such policies would tend to raise production costs

and product prices. And they would impose short-term hardships as people adjust. That is difficult to do at any time, but it will be especially hard during a time of inflation. We should, however, be willing to bite the bullet on an issue of such great importance. We must never again be caught in a position such as we were with energy—a position in which we systematically undervalued (and overused) a precious natural resource. Our strength is in food, and we must not dissipate it.

The specter of higher worldwide grain prices brings into question the role that livestock will play as food in the future—both here and abroad. Obviously, Americans love meat and meat will continue to be an important foodstuff here in the United States. Most countries of the world have a strong desire to develop their herds for both political and nutritional reasons. What is unclear is the type of meat we will be eating in the future. It is likely that market forces will shift our consumption to more poultry and pork. And we will be challenged to alter public policy to accommodate economic reality. For example, our current beef grading system encourages the kinds of marbling that is produced through intensive finishing with grain. This, and other policies that reward the use of an increasingly scarce and valuable resource are likely to change. In fact, advocacy of such change is already heard from some prominent meat scientists.

The second principle is price stability.—The increased dependence on uncertain export markets and the continued full use of our land resources will bring its importance into sharp focus. We know that people can—if they must—build inflation (or even real price increases such as have occurred for energy) into their lives if they can plan for it. What we cannot tolerate as a people is large and unanticipated fluctuations that puncture consumer pocketbooks or destroy farm income.

One of the key requirements for stability is management of grain stocks. We have made considerable progress in this area over the last 4 years, but we have generally had more than adequate supplies. Over time the challenge will be to insure that our reserve policy is equitable for all Americans, and that its benefits and costs are evenly distributed. Reserves are not a farm issue; they are a food issue and, unless farmers and policymakers recognize that fact, the acceptability of the concept of farmer ownership of those stocks will be questioned.

There is the larger question of our responsibility to the world as a whole. I am a realist. I know that we can neither feed the world nor overcome world hunger simply through periodic shipments of grain. It is also wise, I think, to be somewhat skeptical of the ability of international organizations to overcome their own internal political problems and handle reserves in an even-handed fashion. On the other hand, the moral dilemmas of our time demand that we give more attention to attempting to fashion a worldwide stocks-management program that can be effective in short-term emergencies.

The third principle is the use of food as an instrument of trade and foreign policy.—I'm certain that we have not yet fully absorbed the lesson of last winter's Russian grain embargo. President Carter's action barring the sale of agricultural products in the wake of the Soviet invasion of Afghanistan was fundamentally different from other embargoes of the recent past. The suspensions of soybean ship-

ments in 1974 and wheat in 1975 were dictated solely by domestic inflation considerations. Short supplies and rapidly rising food prices for American consumers made it politically impossible for the Government to allow exports to continue. Last January's embargo originated in foreign policy considerations outside the traditional domestic tug of war between farm income and consumer prices. While the administration was fully aware of the domestic consequences of the embargo, and took significant steps to minimize the adverse effect on products, its only purpose was to use food as a nonviolent instrument of foreign policy.

Even those who oppose the suspension of grain sales to Russia would agree that there are at least some instances when international politics and, ultimately, our own national defense must take top priority. Ironically, many opponents of the embargo were the same people who had previously argued for using food as a tool of diplomacy. Remember the slogan "a barrel of oil for a bushel of wheat?" We are fooling ourselves if we think it possible over the next several years to avoid the foreign policy implications of our food exports. Further, we must understand that we are not the only actors on the world scene. There may be a general consensus among demographers and econometricians that world demand for the products of American farmers will increase in the next decade. But we cannot make the blithe assumption that these statistical projections will be translated automatically into stable, dependable markets abroad. Our exports can just as easily be affected by external political events as they can by the actions of our own Government.

In the past, farmers only had to worry about weather, pests, and irate American consumers. They are now vulnerable to the even more capricious pressures of palace intrigue in unpronounceable foreign capitals and the desire to avoid nuclear annihilation. In the past, international institutions have been unable to summon the will to find collective solutions to international problems. In the future, however, our position as the world's major food supplier will give us ample incentive to push incrementally toward cooperative solutions. In the meantime, it is clear that food export policy must go hand in hand with diplomacy.

There is indeed a dark side to the prospect of rising world demand at a time when many nations will reach the limits of their productive capacity. It is the specter of mass hunger and malnutrition, highlighted in the recent Brandt Commission report: "North-South, A Program for Survival." I will not attempt to sort out the mix of national self-interest and humanitarian impulses that guides our policy toward the poorer developing nations. I want only to make the point that the need for food imports is likely to increase in many poorer countries as population growth runs up against production constraints. Since energy needs in these countries will soak up foreign exchange, there will be increased pressure on the United States for food aid. The dilemma is clear: the attempt to achieve maximum gain from food exports must be balanced against our foreign policy objectives. We will face some difficult choices, especially with respect to those countries that cannot afford to pay us full value for the food we send them.

As we consider our future food export policy, we certainly will be reminded that we are not dealing simply with an economic abstraction

known as world demand, but with a variety of political entities, whose interests may have an important bearing on our power and influence on the international stage.

The fourth principle is an efficient and fair structure for American agriculture.—As food and agriculture issues emerge in the forefront of domestic and foreign policy in the eighties, we will find ourselves asking very basic questions that would have been considered absurd 5 years ago. We will be asking:

"Who should reap the wealth that will result from higher prices and increased land values as we reach the limits of our productive capacity?"

"How can we continue the high productivity of American agriculture as idle land, which is perhaps marginal, is brought into use?"

"What is the most efficient structure for the agricultural sector? Who should own farms? What is the most efficient size for various types of agricultural enterprise?"

"What demands does agriculture make on our natural resources? Where does the agricultural sector fit with the overall economy? What are its transportation needs? What are its marketing needs?"

In my view, one of Bob Bergland's single accomplishments at USDA is that he began asking many of these basic questions. Late last fall, he conducted 10 meetings across the Nation to listen to farmers and other concerned citizens express their thoughts about the forces shaping American agriculture. The results represent the beginning of a significant and far-reaching national dialog, and the new administration would do well to see that it continues.

Concerns over land ownership and concentration of production are sure to emerge as significant national issues in the eighties. Rapidly increasing prices for land as well as for machinery and other equipment have created steep entry barriers for beginning farmers, and barriers to expansion for small farmers. The result has been an increasing concentration of production, separation of farm management and ownership. Our tax policies, such as investment credits and inheritance taxes, may well reinforce these trends.

As the dialog on the structure of agriculture continues, we must avoid the trap of assuming that concentration is necessarily a bad thing. The issues are too important to be lost in a wave of nostalgic sentiment over the virtues of the small yeoman farmer. We must ask, however, whether a continuation of the present trend will in fact insure the most efficient and productive use of our agricultural resources. Then too, there are related questions of income distribution, social harmony, and the maintenance of an economically stable rural economy. We may have already reached, or passed, the point of maximum efficiency on many of our farms. The increased concentration of production limits our flexibility in meeting changing market demands. We should not be anxious to adopt the structure of the American automobile industry as the model for American agriculture.

The discussion of structure is closely related to costs of production and food prices. We should not be under the illusion that structural changes will have any short term dampening effect on rising food prices. We must face the fact that food prices will continue to rise for the foreseeable future. The structural question has immediate bearing, however, on the question of who gets the benefits of higher prices.

Few would begrudge farm operators the fruits of higher farm prices. But the caste system that separates farm management from farm ownership does raise a vital question: How do we achieve a fair income for operators without further augmenting the wealth and market power of large landowners? If we must have higher prices, neither farmers nor consumers want to see most of the benefits distributed to those who need them least.

The fifth principle is the need to provide all segments of society with adequate diets at reasonable prices.—Every indication is that domestic food prices are going to go up and up and up. The World Food and Agriculture Outlook and Situation Board has predicted food price increases of perhaps 15 percent next year. We have already experienced increases of more than 30 percent in the past 4 years. If farmers feared that a consumer advocate in USDA would lower food prices, they certainly should have been pleasantly surprised.

Americans have been used to relatively low food prices. By and large, even in the past few years, real income has increased faster than real food prices. But two important points must not be overlooked in this regard.

First, that is going to change in the next few years and Americans are not likely to accept that without challenging each policy and program responsible for it.

Second, the impact of increasing real food prices on the poor and on the costs of food assistance programs, at a time when there is a political atmosphere that favors reductions in welfare programs, creates painful human and public policy problems.

Although USDA likes to crow about Americans spending 16 percent or 18 percent of their disposable income for food, that figure is really good only for comparisons between years and countries. The fact is that you have to have a family income of about \$20,000 a year before food expenditures are as little as 16 percent of disposable income. Meanwhile, there are 25 million Americans living in poverty. For a family of four, that means an annual income of less than \$8,000. People at that income level spend about 40 percent of their income for food. They cannot sustain a 20-percent increase in food prices without severe dislocations.

Although all Americans have felt severely pinched by inflation in the past 4 years, most have stayed a little ahead of the game. Between 1976 and 1979, the cost of living has increased by about 32 percent. Overall, per capita income has increased by about 40 percent, which the per capita income of food stamp recipients has risen only 17 percent. The poor are not keeping up. They are getting poorer. The reasons for this are easy to discern. Many of the poor are on welfare and most States have not increased welfare benefits to keep pace with the cost of living. Furthermore, the working poor tend to be in jobs that do not command cost-of-living increases. For these people and for society, further food price increases present a list of unpleasant and unacceptable options. They can eat less, with all of the accompanying threats to health and well-being that would create. They can transfer funds which they presently use for housing and heating costs and try to do without those necessities.

Ordinarily, when confronted with such potentially severe disloca-

tions, we would look to Government programs to ease the impact of rising food costs for low-income families. Instead, there are suggestions for further cuts in these programs because they cost so much.

They cost so much, in part, because of increasing food prices. During the past 4 years, the costs of Federal food assistance programs have risen from \$9 billion to \$15 billion per year, despite the fact that we have targeted assistance more and more to the poorest people, eliminated some 6 million people from the pool of eligibles, and proposed major cuts in the school lunch program.

The increased costs are partly a result of people, who had always been eligible for the food stamp program, participating in it for the first time after the elimination of the purchase requirement. They are also partly the result of expansion of the supplemental feeding program for women, infants, and children (WIC). But the increased costs are primarily a result of increased food costs and high unemployment.

In the past, these programs have been broadly supported by the middle-class taxpayers of this country. However, as middle-income people feel more and more pinched by the impact of rapidly rising food prices on their own purchasing power, they may—in the short run at least—be sympathetic to reductions in the food stamp program. They may even perceive that these programs increase demand for food and drive prices up. They might seek to lower prices by eliminating assistance programs.

However, the money spent on food assistance programs goes straight back to farmers and retailers. Certainly the retailer will not be able to recoup these losses through foreign trade. The same is true for those farmers whose products are primarily for domestic consumption, particularly dairy, meat, poultry, and vegetable producers.

Unrest over high food prices obviously raises a threat to orderly world trade. Relatively small increases resulted in embargoes twice in the early seventies. But the moral, political, and economic issues raised are more basic. Even totalitarian governments have not been able to withstand the conflict created by large numbers of people going to bed hungry each night. Surely no democratic government can tolerate such a situation. Agricultural producers, for reasons both selfish and charitable, should lead the way in demanding that public policy and public programs meet the needs of our own people for an adequate diet at a reasonable price.

The sixth principle is the role of regulation.—Rapidly rising prices will, of course, have an impact on regulatory decisions. The new administration has pledged to reduce the regulatory impact on agriculture. As prices are pushed upward, all forms of regulation are likely to have to meet more rigorous cost/benefit tests than they have in the past.

As food costs go up, people are likely to demand a higher quality product and more information to prove that quality is high. It will be imperative that when this is done by regulation, the regulation can be shown to be the least expensive way to achieve the desired goal. There may be less support for regulatory efforts that are proposed on the hypothesis of risk from such things as antibiotics in feed. The lessening of that support may be a mistake, but it is probably a reality.

It must be said that health and safety regulation will have to fight for attention as a consumer issue because it must compete with other issues in this gallery of food and agricultural policy. Discussions on price, export policy, reserve policy, and the distribution of wealth and power in our food sector, will begin to dominate policy agendas of all groups, whether they be producer or consumer, who are interested in agriculture.

All of this has meaning for the coming debate on our food safety laws. Those who believe that it will somehow be easy to change the adulteration standards of current law and modify the Delaney clause, in the wake of saccharin and nitrites will, I think, be surprised to find how difficult it is to change the law. We may all agree that the existing law is troublesome, but coming to an agreement on what the law should say will be much harder. Americans have been eager to have saccharin, but I am not at all sure that this general concern translates into a willingness to give up an ounce of safety—particularly as food prices rise. We will probably have a good, long debate. If that debate is not settled in the next Congress, I believe that the storm clouds of other major food issues on the horizon may push it off the calendar for some time—if not permanently.

Over the past 4 years we have made major efforts to keep health and safety regulatory programs from adding unnecessarily to the price of food or to the size of government. We have, most importantly, introduced new methods of poultry inspection that have eased personnel requirements and made it possible to speed up poultry production, thereby lowering per unit production costs.

We have instituted a voluntary quality control system in meat processing that can save Government dollars and let processors operate more efficiently.

We have reduced the Federal paperwork burden by relieving the meat and poultry industry of the requirement to file the lengthy form 404 on a weekly basis.

We have expanded the use of laying hens for food by expanding the use of papain as a tenderizer; proposed to allow greater flexibility and competition by allowing manufacturers of nitrite-free meats to use traditional names for their products, and allowed the use of more appropriate labeling on the ground beef and soy mixture which used to be called beef patty mix. There are a multitude of other changes of this nature that can be made if the meat and poultry industry are willing to cut loose from old patterns.

Health and safety regulations have been viewed as consumer oriented and, by law, they are. However, the greatest regulatory impact on food prices comes not from these consumer regulations, but from those economic regulations that protect producers by controlling price, limiting supply, and restraining competition. A government that is devoted to fighting inflation and dealing with increasing food prices must give serious policy attention to those regulations.

Furthermore, the public wants a smaller Federal establishment. Policymakers should review carefully all of the programs carried out by USDA and see if there are not some, perhaps many, that could be altered, or dropped, or be carried out by private groups. We have used new methods of meat and poultry inspection to increase productivity.

Perhaps it is time to consider relying more on private enterprise to do in the future many of the things we've relied on government to do in the past. For example, we might consider allowing the private, profit-making sector to take over the market news and grading functions.

The seventh principle relates to the state of our technology base.—Behind any discussion about food and agriculture during the next 10 years will be the assumption that our science and technology will continue to give us the productivity increases to which we have become accustomed. Rational discussion also assumes that we will continue to make advances in subjects like human nutrition and toxicology. According to the National Academy of Sciences, the United States conducts more than one third of the total food and agricultural research that goes on in the world. We must insure that this important public investment is carried out with the utmost care.

Significant questions that should trouble all of us arise as we examine the current state of food and agriculture research:

(1) Were the productivity downturns of the mid-1970's a signal about the state of our fundamental knowledge base, or merely an aberration? The answer is not yet in.

(2) Is the right amount and kind of research sufficiently directed at national problems? Do we spend too much of our research base on important but secondary local "firefights"?

(3) Are we engaging a cross section of our best scientific minds in food and agriculture, or is agriculture research still, in the terms of one of its critics, the "island empire"?

(4) Do we have enough emphasis on environmental safety and health problems, that will surely accompany new technical breakthroughs in productivity, so that we can prevent costly disasters before they develop?

Research, or technology assessment, is seldom accorded a prominent place on our policy agendas. Partly that is because so much has gone right for us in the past decades. But we will be leading ourselves down the primrose path to take this success for granted much longer. And, if we do not take the state of our research apparatus seriously, we will ignore the single largest tool we have to help the world through the difficult times ahead. It would be ironic, in our society where science and agriculture are so strong, if, through neglect, we squandered our excellence in the science of agriculture.

CONCLUSION

These issues illustrate the fundamental importance of agriculture to the welfare of all Americans in the last decades of this century. They mean we will have to rethink the overall level and nature of public investment in agriculture.

When overproduction was a problem and food was very cheap, agriculture policy could be made separately from food policy. No one but farmers and agribusiness corporations cared about agriculture policy. But as food becomes more important on the world stage, as food prices continue to spiral and to absorb larger amounts of total income, more and more people will surely demand a larger role in decisionmaking. Agriculture programs will emerge from the shadows

along 14th and Independence Avenue into the bright sunshine of public scrutiny.

It is not a unique situation. Back in the sixties, the Great Society was born and a number of social welfare programs were developed to fight poverty and hunger. They commanded great support and large resources. As they began to occupy a larger and larger role in the Nation's budget, they increasingly have become subject to intense evaluation. The public has demanded a better accounting of the money spent. It has been necessary to document effectiveness, tighten administration, and cut eligibility. The food stamp program, for example, has been probed again and again by the Senate and House Agriculture Committees. That is appropriate when the public's money is being spent.

Agriculture programs have not been subjected to the same scrutiny by the Congress or the public. High food prices and the demand to reduce Government spending and personnel will combine to change that.

When we consider the broad historical sweep of the changes we have been discussing, I believe that the eighties will come to be known as the decade in which our Nation discovered the importance of agriculture policy, just as the seventies was the decade in which we discovered the importance of energy policy. For most of this century, we have tended to regard "the farm problem" as a rather parochial and specialized matter that mainly concerned only one segment of our society.

We must now recognize that the farm problem is a matter of crucial concern to all Americans. Along with energy policy, food and agriculture policy will occupy a place in the forefront of our national concerns. Our decisions on the future of American agriculture will affect not just the economic health of one sector of society, but the health and well-being of all Americans, the stability of American society, and America's place in the world.

COMMODITY PROGRAMS: ISSUES FOR THE EIGHTIES

(By William C. Motes, Office of Budget, Planning and Evaluation,
U.S. Department of Agriculture)

Thank you. I appreciate this opportunity to spend a little time this morning discussing the commodity issues of the coming decade. Looking forward for a decade is always humbling. Looking forward now involves all the ordinary risks that lead economists to make wrong predictions, plus a few more.

However, I want to discuss three points this morning—to describe three lists. The first includes areas of policy where I expect general agreement. The second outlines important areas of the broader context within which I expect the commodity issues of the coming decade to be debated. The third contains what I think are some of the key commodity issues of the next several years.

Lest anyone make the mistake of expecting hard answers to policy questions from this discussion, let me hasten to point out that policy analysts are, in a sense, more responsible for asking the right questions than for predicting the future. I cannot say what the future will bring for agriculture during the next 10 years, either in terms of agricultural policies or economic conditions. Instead, I want to hazard some guesses about upcoming issues—guesses about some of the topics that will be debated in the Congress and elsewhere during the eighties.

In a sense the context of the debate on commodity issues will be as important as its focus. I want to anticipate something of that context with the first two of my three lists—the areas of general policy agreement and broad contextual issues that affect agriculture.

Areas of general policy agreement.

Areas of general agreement tend to provide our policy objectives—the general ground rules for the debate on those issues which remain to be resolved. I believe at least six such rules can be listed:

1. Policies must increase the stability of our agricultural production and prices with minimal administrative intervention in private decision processes.

2. Policies must provide incentives for market growth and facilitate effective competition in both domestic and foreign markets. I may be wrong, but I do not expect the policy debates of the coming decade to center upon whether Government should administer agricultural prices above market clearing levels in either world or domestic markets. I believe that question has been answered in the negative, with some notable exceptions. The exceptions are generally regarded as programs in transition.

3. Policies must enhance the adequacy and reliability of the domestic supplies of food and fiber.

4. Policies must help assure the quality of U.S. agricultural products.
5. Policies must foster continued productivity growth in agriculture.
6. Policies must avoid contributing unduly to inflation.

Some of these may be seriously challenged, but I do not expect so.

The setting for commodity issues of the eighties

The general economic setting.—It is trite to observe that economic changes are unusually rapid now, but I expect that cost changes, and especially energy cost changes will dominate the economic setting of the next decade. In 7 years, since 1973, oil prices have increased from \$3.39 per barrel to over \$30 per barrel. By the end of the decade of the eighties, optimists think oil prices will double, and pessimists think they will triple, or more. For these and other reasons, inflation will likely continue to be an issue in every policy debate, including agricultural policy.

Oil cost changes will increase production costs, change production patterns, and change input use in all of agriculture. They will increase the demand for grain for alcohol and thereby amplify production cost shocks. I suspect that the rules of the game for alcohol production—the provision of special tax incentives; low cost credit; and perhaps special programs to guarantee feedstock availability and price will be an issue, and perhaps a major issue during the coming decade.

Inflation and economic change has an additional impact. Food price inflation is such an important issue to all consumers that it leads them to become increasingly involved in commodity policy issues. When farm prices for beef, pork, and poultry recover next year from the levels of 1980—low prices that could not be sustained—consumer interest in the 1981 farm bill debate may become much more intense than we now expect.

In addition, we are seeing more and more evidence that we are passing some sort of balance point. The premier problems of agriculture in the future are more likely to be related to scarcity than to surplus. Such transitions can never be pinpointed in time, and it is probably more important to recognize that such changes are taking place than to attempt to discern just when. Global population and economic growth can be expected to continue, absent an increase in military tensions. This growth will further increase the demand for food, and for higher quality food as people and nations are able to upgrade their diets. Such trends mean increasing international trade for the United States, and that exports will be a growing share of our total domestic disappearance. This could well mean rising real prices for farm commodities and for food. It could also mean less stable agricultural prices, as well as increasing pressure on agricultural and natural resources.

Such changes come slowly. We can expect that good weather will be necessary to satisfy consumption requirements, but that widespread good weather will bring weak agricultural prices around the world. Bad weather will bring stock reductions and strong prices. While the current indications of shifts in global indexes of production and use must be evaluated with caution, they continue to support the view of those who believe we should now begin to emphasize the likelihood of scarcity in our policy considerations more than in the past.

In discussions of issues for the eighties we need to observe that a new team will be in charge of the execution and development of agricultural policy soon after the beginning of the new year. The fact that the team in charge will now be changed is important because it affects which issues get considered first. Most items that compete for space and position on our policy agenda are there because of broadly felt and recognized economic and political concerns. Events and economic conditions, more than economic or political objectives, tend to define the course of U.S. agricultural policy. However, once we know more about the issues the new team wants to tackle first, we will have a much clearer picture of how policies for the eighties will be developed.

In an effort to make the discussion of the policy context for commodity issues somewhat more manageable, I want to describe four other broad, contextual issues very briefly. They share two characteristics: They are difficult and controversial, and they are not just commodity issues, but are important to commodity programs nonetheless. They are "prior" issues in the sense that their outcome significantly affects U.S. commodity policy.

International and domestic food assistance.—I suggest that the definitions of this Nation's commitment to feeding hungry people, both at home and overseas, will have a major impact on agriculture. The International Food Security Reserve very likely will be formally authorized. However, current foreign aid program budgets are now over extended. There are proposals on the table to reduce benefits available to participants in domestic feeding programs and there are hints of deep reductions. The outcome of that debate will be important to both those who need food assistance and to commodity producers.

Resource conservation.—Both water and soil conservation issues can be expected to intensify as resource availability and productivity become more important. Between 1969 and 1980, about 56 million acres of land were brought back into crop production—about 16 percent of the cropland harvested in 1979. In 1980, as much as 80 percent of the severe soil loss problems are concentrated on about 10 percent of the land. We can expect more intensive cropping and increased soil loss on land where losses are not now severe. Some of this land is vulnerable to loss rates that will rather quickly reduce productivity.

The three policy tools available to deal with soil and water conservation have changed little over the years. The Government can provide technical assistance and information; it can provide economic incentives and share the cost of conservation measures; and it can provide economic and legal penalties for not protecting resources. The first two approaches are costly both in budget outlays and in terms of measurable benefits. They are sometimes challenged because they increase the value of privately owned resources. The third approach is difficult to administer objectively and tends to be unpopular.

Structure of agriculture.—The fourth so-called prior issue will, I believe, focus broadly on trends in the growth in farm size, the decline in farm numbers, and the disparity among farms in their potential for providing family income strictly from farm sources. Farmers often see these concerns in terms of the difficulty their sons and daughters have in beginning to assemble a viable farm unit, and in terms of the pressures they themselves feel to increase production and productiv-

ity—and risk. They are concerned about nonfarmers who control farms, and about the growth of farm corporations, as well as about taxes and schools.

The scope of this debate is breathtaking. It ranges from challenges to the inclusion of productivity increases as an unconstrained policy objective, to tax and investment policies, research management and direction, and characteristics of rural life.

The issue of family farm survival and the proper role of Government programs in facilitating or directing structural change is an old one. However, based on the response to Secretary Bergland's hearings on structure, I believe a more intense debate is just beginning. I also believe that the principal force attempting to move the structure issue, or some parts of it, on to the national agenda come from within the mainstream of commercial family farm agriculture. If I am right, this issue will likely be debated early in the decade. If I'm wrong, it will come later, if at all.

Agricultural productivity.—There are two kinds of issues here. The first is the continuing question of how to assure that appropriate investment levels in research are made in the quest for increasing yields and production. The question of whether or not agricultural productivity has slowed is bogged down in nonproductive controversy. The problem is partly one of measurement because although productivity for much of agriculture depends heavily on investments in research and capital, it also depends on weather. A few good years in a row can change the trend for a large share of agriculture and so can a few bad years. However, there is a new element in that debate. Our land resources, at least our best lands, are now fully committed. Labor productivity probably can be increased still through more and better machines but only at high costs. Substantial increases in productivity seem most likely to come from genetics. This takes research, in most cases, either by private firms or by public institutions.

The second part of this issue is somewhat more exotic. It concerns how we identify and protect against regional and even global changes that affect agricultural productivity. Chemical changes in the atmosphere are changing the chemistry of our air and water. In some areas, the acid content of air and rainwater is now affecting crops. The current steady 1.5 percent per year buildup of carbon dioxide in our atmosphere may affect our mean annual temperature by the end of this century, or before. These concerns and a number of others like them go far beyond agriculture, but they are increasingly being raised in terms of long-term and even short-term agricultural productivity.

The debate about research needs has been going on for years. It will intensify during the decade as real prices of food increase, and as the longer term consequences of atmospheric and other environmental changes are better defined. It may concentrate on the question of how research can be better targeted, as well as whether or not research funds are adequate.

With these "prior" issues mentioned, I now turn to commodity issues as I see them.

Commodity policy in the eighties

Perhaps the central commodity policy issue during the decade will concern the continuation of the reserves policy. I expect this debate

to include questions of whether or not we have a reserve, and, if a reserve is to be maintained, how it is to be managed as well as its purpose.

At this time, and since 1977, the farmer-owned reserve has been the major commodity policy tool. It has, I believe, about six key characteristics.

1. The reserve is intended to benefit farmers by providing them a mechanism to temporarily enhance grain prices during periods of good weather and heavy production by isolating part of their stocks from the market.

2. The reserve is intended to benefit consumers by increasing the reliability of grain supplies and of food supplies.

3. The reserve is intended to support the policy of expanding export sales by reducing the likelihood of short supply export restrictions. The "call price" mechanism is designed to give domestic and foreign consumers reassurance of fair prices when production is short.

4. The reserve release price is intended to approximate, long-term equilibrium prices. It is expected to clear markets and lead to the continued investment necessary to alien production and market growth.

5. The range between the release and call price is intended to assure producers holding stocks that the Government will not restrain normal price increases above the release price level. CCC-owned grain cannot be sold for unrestricted use until the call level is exceeded by 5 percent.

6. The reserves policy is designed to operate at low levels of Government cost. The commodity loans are repaid, generally. However, legislation passed this week mandates that the interest be waived.

Since 1977 the reserves policy has been supported by the price and income support programs that were restructured in the early seventies. Target prices provide economic protection for producers by covering costs the average producer cannot postpone. Price support loans are used to provide additional down-side price protection; to provide production credit; and, to provide the basis for key management mechanisms of the reserves.

In addition, set-asides and acreage diversion programs have been used when longer term production adjustments were needed.

I expect three kinds of debates regarding the reserves policy. The first will concern whether it works in the sense of providing "adequate" price and production stability and income protection, and whether these objectives could be achieved some other way at lower cost. By next year the reserve will have completed one cycle of buildup and liquidation if current projections hold. That makes it an appropriate time for a thorough analysis of the impact of that policy on farm prices for both grains and livestock; on producers' incomes; on Government costs; on food prices; on foreign exchange earnings; and on what would have happened to all those things under alternative programs and alternative policies. This debate has already begun—somewhat prematurely, I believe, since it is as important to see what happens when grain comes out as it is to see what happens when it goes in.

The second part of the debate on the reserves policy can be expected to focus on the price levels and variability implied by the reserves

policy. There are concerns that a reserves policy will develop the same problems our price support policies had through much of the postwar period; namely, that attempts to stabilize prices around long-term equilibrium levels will end up enhancing prices above such levels so that U.S. products are priced out of important markets.

This would lead to conditions where reserve and CCC stocks increase sharply and overhang markets; program costs increase; Government restrictions grow, and farm income is reduced.

There are counterarguments to that scenario. Pressures to establish program prices at inappropriate levels are persistent, but because the reserve release price limits when grain owners can sell, there is less pressure to increase that price than there was to increase loan rates. Second, the Secretary can limit the quantities permitted to flow into the reserve if necessary. Third, because the reserve program is undergirded by a target price and loan program, limiting reserve levels does not leave producers without price or income support. And, fourth, the reserve programs are much more market oriented than the earlier price support programs. They depend on market movements over quite a wide range of prices to guide producers' production and marketing decisions.

A third possible kind of debate over the reserves policy can be expected to arise from concerns over the possible future needs to manage scarce supplies. I do not expect a serious debate over whether or not we should have a national marketing board—there appears to be little support for such a concept. However, there are serious concerns over the shocks that can come as the result of political decisions by a large state-trading nation to enter U.S. markets in a major way to cover a crop shortfall, to build stocks, or to upgrade food quality. This, together with the growing concern that world food and feed demands are generally outpacing supplies leads some analysts to suggest a debate on short supply management.

Those who advance these concerns point out that we become more vulnerable to price instability as the share of U.S. domestic production that goes into export markets increases. For example, for wheat, exports were less than half of total utilization in 1970, but nearly two-thirds by 1979. In the meantime, wheat production increased by 50 percent. Corn exports were 12 percent of total utilization in 1970, but almost three times that important in 1979. And, annual corn production increased by almost 50 percent over the decade.

Apart from the maintenance of a reserve, there are relatively few policy tools available to deal with large demand swings. The Government can take the position that stocks from annual production are generally adequate to deal with such demand swings and that prices should be relied upon to allocate supplies. However, no administration so far has been willing to allow a complete price allocation adjustment when supplies of an important crop were seriously short.

The other extreme would be to build U.S. reserves unilaterally to levels that will stabilize world prices. To some extent, the current reserves policy for food grains implicitly does that because U.S. feed grain exports represent such a large share of world trade. For food grains, however, the reserves policy was initially designed to make clear to the world that the United States expects the other major grain

exporters and importers to build adequate levels of grain stocks themselves. It may be that grain importing countries will be more interested in holding stocks in the future if supplies become tighter (and more uncertain) and prices less stable.

Bilateral agreements are frequently mentioned as a means of reducing demand uncertainty. We could attempt to fashion agreements that provide priorities for access to U.S. grain for those countries who buy grain from us regularly. In theory, we could protect some minimum level of product for domestic use by allocating exports among foreign customers—perhaps on the basis of negotiated premiums over domestic prices, or on a first-come, first-served basis, or using some other allocation system. If export premiums were negotiated, there would be the possibility of equitably sharing them with producers. Such a program would be controversial and extremely difficult to administer. Most proposals to deal with short supply situations would be very unpopular, at least in some quarters. I will be surprised if this debate occurs much ahead of the time actual decisions must be made.

I expect that the debate over the use of food as a weapon will continue. The prospect of such actions is unpleasant and unpopular, as we have seen. Still, policymakers find the possibility tempting in certain contingencies. I expect the appropriateness of such actions and the Government's responsibility to offset their impacts will continue to be controversial during the eighties, as it was during this year. It is quite possible to isolate even large amounts of storable products from the market in an effort to moderate the impacts of an export restriction. It is, however, difficult to get agreement on the range of such steps to be taken, and on their timing.

The reserves policy now applies to food and feed grains. If the policy is to be continued, the question of whether it should be extended to oil-seeds—soybeans and/or sunseed will be important. And, the same question will apply for cotton. Reserves can be established most easily when stocks are large, but we do not expect large cotton stocks for the first years of the decade, so this issue may be avoided for some time.

In the context of the grain reserve policy, I expect that there will be additional debates concerning a range of topics including the role of target prices and other direct payment programs. I expect proposals to relate target price levels to particular objectives or to farm size. A higher target price could be provided to farmers who meet certain conservation standards, for example.

One final note on the reserves policy. Because many economists are at least closet Malthusians, they tend to see evidence that the demand for food is increasing more rapidly than supply and to overlook (sometimes) evidence that there are opportunities for increases in food production, especially where there are strong prices. Investments in research, and even small improvements in the systems of storing, handling, and distributing grain can have very positive results on total supply. Since 1973, agricultural analysts have been relegating our commodity programs to standby roles. While the evidence is more persuasive now, it deserves careful interpretation.

We could be wrong about the increases in demand we expect here and overseas. We will be wrong about the weather, I am sure. If there is a lesson that we should learn from the last decade and that we should

attempt to project into the future, it is that we must build flexibility into our programs to permit them to deal with the unexpected.

With some important exceptions, that is not the direction we have been going. The Secretary's legal authorities have become increasingly specific and he has less discretion to manage programs than he once did. There are formulas for minimum dairy price supports, meat import triggers, and target prices were set by formula until last spring. Cotton loan rates are set by formula.

In fact, the more we need these programs, the less well the rigid rules let them work. Rather than help programs deal with rapid change, they frequently hamper such efforts. I would hope that the need for administrative flexibility would be clear, but I fear it will be controversial. If so, that debate will be an important one.

Troubled program

Dairy.—The dairy program in 1979-80 cost more than \$1 billion, and dairy price support levels were, by law, required to be raised twice that year in spite of the production surpluses. In 1977, the Congress set the minimum dairy price support level at 80 percent of parity for 2 years, and required that supports be adjusted twice annually. In 1979, in the debate over whether or not to support an extension of the 80-percent amendment for 1980 and 1981, studies by CBO, USDA, and several land grant universities indicated that the program was unlikely to face serious problems with supports at 80 percent of parity, unless three things happened—feed prices much lower than expected, beef and cull cow prices much lower than expected, and the demand for dairy products much lower than expected. Price support minimums at 80 percent of parity were seen as a risk, but not a huge risk.

An amendment that would have increased the Secretary's flexibility to modify scheduled increases in supports when surplus production was expected was proposed, but it was not accepted by the Congress. The extension of the 80-percent minimum passed. Then all three of the events of concern happened. Very costly surpluses mounted all through 1980 and probably will continue to mount through 1980-81—while dairy price supports will be increased twice more.

I expect that a number of proposals to modify the dairy programs will be debated, including efforts to change the index upon which supports are based to one more responsive to dairy production costs than the current broad based parity index. I expect proposals to increase the flexibility the Secretary has to establish support levels more appropriate to adjust production. And, I expect there will be serious proposals for a direct payment program such as a target price program.

In addition, I expect proposals to change the extent of regulation under the milk marketing orders. One proposal concerning reconstituted milk has been made and evaluated. Dairy price support and marketing programs will almost certainly be an increasingly significant issue during the decade of the eighties.

Peanuts.—The current peanut program has been much less costly than programs in the early seventies, but it still depends on both acreage allotments and poundage quotas to adjust production. The value

of acreage allotments has become capitalized into land and lease values. This capitalized value adds to the cost of production for those producers who lease land.

The peanut program was developed as a transition program in 1977. I would expect that it will continue to be a focus of debate in 1981.

Sugar and tobacco.—Two other commodity program areas will likely be debated, as well. We now have no comprehensive domestic sugar program. An international sugar agreement to stabilize world prices was signed in 1977 and ratified this year. When prices increased last year, ISA stocks probably moderated the increase but not for long. The ISA terms and conditions come up again in 1982, and the question of levels of stocks and price ranges will be a matter of controversy.

The domestic sugar industry will likely continue to decline in size and importance unless it can be assured of more stable prices. Production costs for sugar around the world appear to be increasing faster than in the United States. I would expect the issue of the role of the domestic sugar industry in helping stabilize domestic sugar prices will be debated once again. Unfortunately, as debates on sugar policy have become increasingly intense, they have become more emotional and less focused on the issues. The direction of future debates is unclear.

The loss of markets for U.S. tobacco has been a concern to U.S. growers for several years. Under the law, the tobacco price-support level for each kind of tobacco is adjusted each year by the change in the latest 3-year average of the parity index. The Secretary has very little leeway to adjust individual grade loan rates. Devaluation of the U.S. dollar in relation to major overseas currencies has helped U.S. tobacco compete, but grower prices remain above the level of overseas competitors. For many years U.S. tobacco export levels have been relatively constant while foreign growers have captured all the increase in overseas sales. The U.S. share of world tobacco export trade dropped from 31 percent in 1966-70 to 19 percent last year. At the same time the volume of imports has steadily increased. For cigarette tobaccos, the import share rose from 18 percent in 1969 to 30 percent in the 1979 marketing year.

The tobacco program continues to be controversial. Every recent session of Congress has seen a number of bills introduced to abolish the tobacco price-support and allotment program. I expect the tobacco debate to continue and intensify, especially if program costs increase.

I want to mention very briefly two other commodity policy issues that I expect will be debated during the next decade. The first concerns the Government's role in helping reduce producers' risks from natural disasters. The second concerns the Government's role in providing production credit for agriculture.

Natural disaster policy.—New legislation will expand the current Federal crop insurance program into a comprehensive all-risk insurance program to provide higher levels of protection for crops. The Government will subsidize 30 percent of the premium cost, up to specified levels of coverage. This program is intended to replace the current disaster payments program.

For 1981, both the disaster payments program and the subsidized

crop insurance program will be available in many counties, and producers may choose one or the other.

I expect two issues to emerge. The first is whether the disaster payment program will be ended with the 1981 crop, when current authority expires. The second is whether other natural disaster programs which overlap the new crop insurance program will be folded into the insurance program, or dropped. The emergency loan programs under FmHA and SBA that provide highly subsidized loans for actual crop loss are examples.

Agricultural credit.—The economic trends that have increased agricultural productivity have also made farmers more dependent on non-farm inputs and increased their dependency on credit. In 1979, the debt-to-asset ratio was roughly 17 percent, compared with 9.8 percent in 1950. For the larger farms, that ratio is 25 percent and rising rapidly.

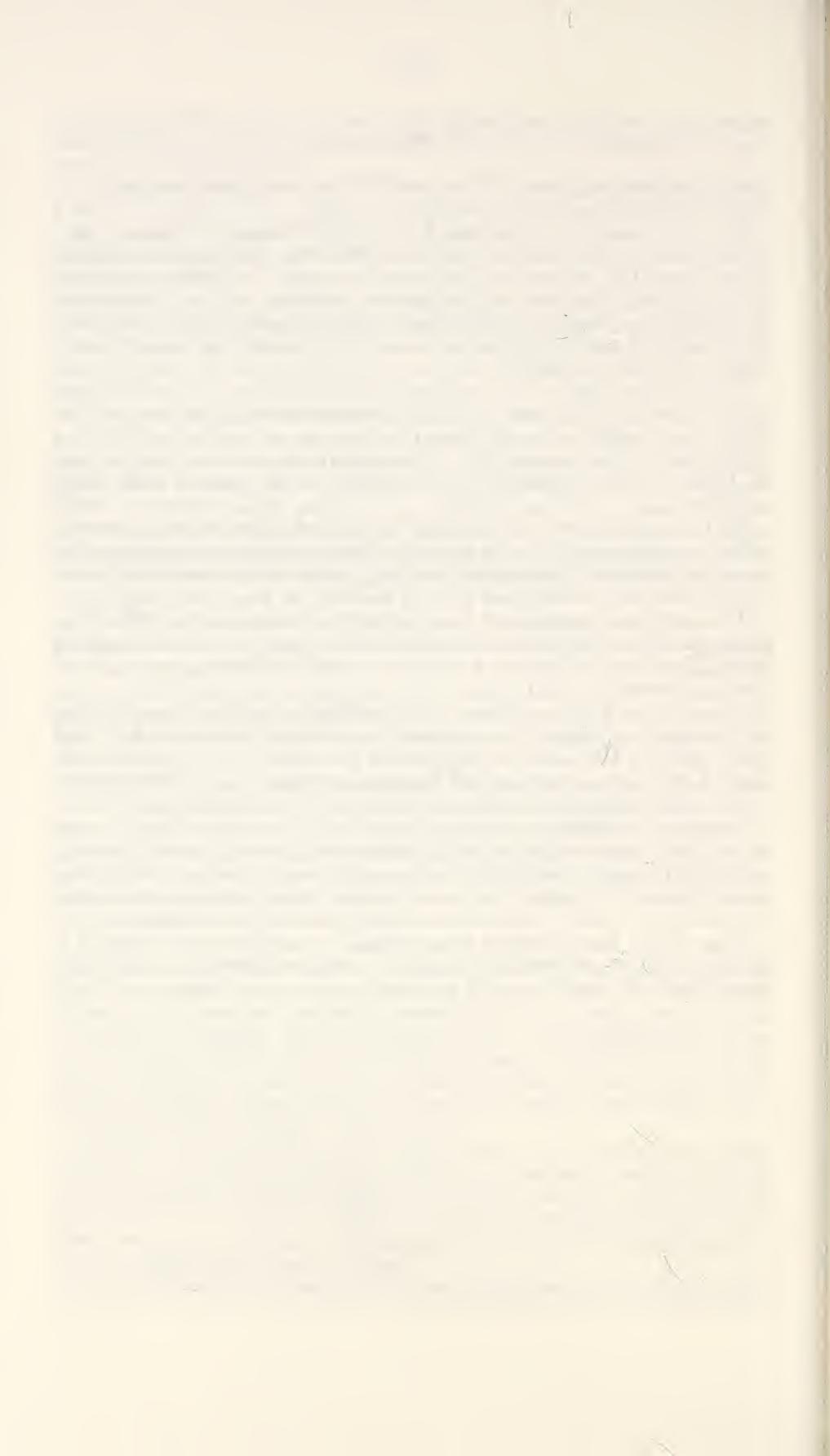
As farmers become more heavily capitalized, they become more vulnerable to financial risk. As a result, there have been increasing pressures to increase Government lending, and to increase the Government's role in reducing that risk by lending on favorable terms.

The economic emergency loan program, authorized in 1978 is an example. That program is now authorized \$6 billion in outstanding loans. That new ceiling may be reached well before the program expires in September 1981.

Overall, the Farmers Home Administration role in farm lending has increased sharply. It accounted for about 6.3 percent of all real estate debt in 1978 and is projected to hold about 9 percent by 1980. FmHA held under 6 percent of the nonreal estate debt in 1978, 12 percent in 1980 and is projected to account for 15 percent by 1981.

I expect the Government's role in providing credit will continue to be an issue in the eighties, both in terms of its role in making credit available through commodity loans, and through production and real estate loans. The debate will also concern the Government's role in providing favorable credit terms to help reduce production risk.

I apologize for listing so many issues in such a cryptic way. It is hard to collapse a decade of issues into a few minutes. On the other hand, there will be at least 10 years to continue the discussion.



U.S. FARM FOOD POLICY: WORLD VIEW

AGRICULTURAL OUTLOOK: UNITED STATES AND WORLD OVERVIEW

(By J. Dawson Ahalt, Chairman, World Food and Agricultural Outlook and Situation Board, U.S. Department of Agriculture)

INTRODUCTION

The world food and agricultural outlook is much tighter now than it was a year ago. We are facing an abrupt turnaround from the 1976-79 period of relatively ample world supplies of grains, oilseeds, sugar, cotton, and even animal products to the tightest supply situation for those commodities in the past 5 years.

Clearly, higher crop and livestock prices than this year's are in prospect for U.S. producers in 1981. It is safe to predict that net farm income in the United States will rebound considerably from its depressed 1980 level. With this improved prosperity for agriculture, though, will come higher retail prices for most major food products.

But the overall impact of this altered world agricultural situation will depend on a number of critical variables in the coming year: Rates of economic growth here and abroad and their implications for inflation and consumer demand, the scale of adjustments by United States and other livestock producers to tighter and higher priced feedstuff supplies, the nature and scope of policy changes by the new administration, and, perhaps more than any other factor—the weather.

MAJOR VARIABLES

These four variables warrant a closer examination before we move on to the outlook for commodities, trade, and U.S. farm income and retail food prices.

ECONOMIC CONDITIONS

Economic growth slowed considerably in most countries during 1980 and in some cases halted altogether. Economic performance in the European Community is off about two-thirds from its 1979 pace. The United States, the United Kingdom, and OPEC have suffered recessions in 1980 and a number of developed countries have experienced slow or negative growth in the second half. High petroleum costs and tight fiscal and monetary policies have largely been responsible. The Iranian revolution and Iranian-Iraqi conflict have been the major reasons for the halt of growth in OPEC. Economic activity also slowed in most developing areas as a result of high petroleum import costs and, in some cases, political instability.

ESTIMATED ECONOMIC INDICATORS, SELECTED COUNTRIES/REGIONS

Country/area	Change in gross national product		Change in Consumer Price Index	
	1979	1980 forecast	1979	1980 forecast
United States	2.3	0.8	11.3	13.3
U.S.S.R.	2.0	2.5	NA	NA
East Europe	1.5	2.5	NA	NA
IEC	3.5	1.3	8.7	11.8
Japan	6.0	4.5	3.5	8.0
Canada	2.8	1.6	9.2	11.0
Australia	2.5	2.0	9.0	10.0
Brazil	6.5	5.0	77.0	50.0
Argentina	8.0	5.0	140.0	50.0
India	3.0	4.0	8.6	13.0
IEC's				
Asia	3.3	5.4	14.1	16.1
Africa	1.3	2.0	19.7	20.0
Latin America	6.5	5.8	58.7	56.0
OPIC	1	3.9	17.0	20.7
OECD	3.3	1.3	8.5	11.3

NA—Not available.

The tightening of money supplies to rein in inflation in most countries will slow economic recovery in 1981. In the United States we may see some growth in the first half of the year, increasing somewhat in the second half. Foreign economic growth rates should, nonetheless, be high enough to support increased consumer spending, including improvements in food consumption.

Inflation is averaging about 11 to 12 percent in the developed countries this year and substantially higher elsewhere, though many developing countries have succeeded in slowing these rates somewhat. Barring any further major jolts in petroleum prices, most areas of the world anticipate slower inflation rates in 1981.

In the United States, inflation is likely to decline from its 1980 pace of about 13 percent, falling perhaps a shade below 10 percent for the first time since 1978. Food prices will probably account for a bigger share of overall inflation in the first half of 1981 than they did during the same period this year, but the increases should ease in the second half.

With real disposable income in the United States apparently shrinking slightly for all of 1980, and with little prospect of significant gains for at least the first half of 1981, we can expect to see some shifts in consumer demand to relatively lower priced foods and other goods and services in the coming year.

LIVESTOCK ADJUSTMENTS

Total meat output in the major producing countries is apparently up slightly this year. Gains in pork and poultry production offset a decline in beef output—most countries' cattle herds are in their rebuilding stage. World beef prices, feed prices, and general economic conditions will determine whether cattle producers continue herd expansion during 1981 or decide to rekindle the liquidation process.

Pork production has increased substantially again this year among the major producers, even to the point of oversupply in the United States. Pork production may decline here and in Canada next year.

due to the squeeze on producers. Production gains elsewhere will probably slow from their pace of the past several years.

Similarly, increases in poultry output next year will be smaller than in recent years because of depressed producer prices earlier this year and the likelihood of continued higher feed costs. Nonetheless, worldwide demand for poultry continues strong.

The Soviet Union, which is second only to the United States in meat production, will bear close watching this year as the Soviets ration their short feed supplies. Consecutive bad grain harvests in the U.S.S.R., the tight world grain situation, and the U.S. grain suspension are curbing expansion in the Soviet livestock sector. Hog inventories have been cut this year and poultry numbers are also likely to drop somewhat in 1981. Cattle herds have been maintained this year but slaughter weights have been lower; a severe winter and feed shortages could lead to some trimming of herds.

POLICY CHANGES

The effects of U.S. policy changes on the horizon are especially hard to predict at this time, in the advent of a new administration and the quadrennial redrafting of the Nation's food and agricultural legislation. The administration that takes office in January will have to face a number of key policy issues that are important for U.S. and world agriculture over the next several years. But for 1981, the tightness of the market will probably generate prices generally above price and income support levels. This may ease some of the pressure for adjustments in commodity support levels in the near term.

Policy changes abroad remain important and will, as usual, affect the U.S. agricultural scene. Foreign decisions on dietary improvements, domestic food policies, and barriers to trade will help determine the demand for U.S. agricultural products and their accessibility to foreign markets.

WEATHER

Not that it needed it, but the susceptibility of agricultural production to the weather has been emphasized again this year. The two leading examples are the Soviet Union, where unpredictable weather often plays havoc with farming, and the United States, whose main producing area normally has about the most dependable weather in the world.

Cold, wet weather was responsible for a second consecutive poor Soviet grain harvest. Our current estimate of 185 million tons puts this year's crop 52 million tons below the 1978 record and only 6 million tons above last year's disastrous crop. The Soviets' vulnerability to the weather, and, subsequently, the size of their year-to-year swings in grain production appear to have increased as the Soviets have expanded their plantings into more marginal growing areas.

The drought that hit the U.S. Corn Belt and neighboring regions this year was the worst since the early 1950's and caused one of the sharpest year-to-year drops in production of corn, soybeans, sorghum, and cotton on record. It bears noting that the magnitude of the production decline is exaggerated somewhat by the fact that it followed an outstanding year in 1979 for all the major U.S. crops.

The United States was not the only country hurt by a lack of rainfall this year. Canadian wheat was hurt by the same drought that plagued our northern Great Plains. Prolonged drought in Australia has cut into that country's exportable wheat supplies and dry weather has seriously affected Argentine wheat as well.

The effect of this year's drought on the United States was diminished considerably by our unusually large stock levels coming into this season—the 78-million-ton carryout of grains from the record 1979 harvest was the largest in 15 years. Next year, however, the United States will not have the cushion of a large carryover.

If more normal weather patterns return, U.S. output should rebound next year; the country has not had consecutive declines in grain production in the past two decades. Corn yields this year are about 20 percent below trend and meteorologists calculate the chance of U.S. corn yields dropping 10 percent or more below trend again next year to be about 1 in 20.

With stocks generally depleted, the danger looms that disappointing harvests worldwide again next year would lead to widely fluctuating prices and perhaps serious food shortages in some areas of the world. The fact that we face such a prospect just 2 years after accumulating our largest global stocks of grains in over a decade underscores the continued fragility of the world food situation—that the balance between too much and too little food can tilt easily, and rapidly, from one direction to the other.

COMMODITY SITUATION AND OUTLOOK

Grains

World grain production this year is estimated at 1.45 billion metric tons of wheat, coarse grains, and rough rice, virtually unchanged from the 1979 harvest but considerably below the 1978 record. Increased production in Europe, India, Canada, and projected increases for Argentina's spring-planted grains offset the worst year-to-year setback in U.S. grain output in 6 years, smaller crops in Australia and China, and a second disappointing Soviet harvest.

[In percent]

	U.S. share of world			Ending stocks	Share of U.S. production exported
	Production	Trade	Consumption		
Wheat:					
1970-71	12	36	6	30	54
1979-80	14	44	5	28	64
1980-81 ¹	14	45	5	28	62
Feed grains:					
1970-71	25	42	24	43	13
1979-80	32	71	21	59	30
1980-81 ¹	27	72	20	40	37
Rice:					
1970-71	1	19	1	3	55
1979-80	2	22	1	4	61
1980-81 ¹	2	22	1	4	61
Soybeans:					
1970-71	81	90	40	85	59
1979-80	66	84	30	54	39
1980-81 ¹	59	80	28	34	47
Cotton:					
1970-71	19	22	15	20	38
1979-80	22	41	10	14	63
1980-81 ¹	18	28	9	14	51

¹ Forecast.

WORLD SUPPLY AND UTILIZATION: GRAINS, OILSEEDS, COTTON

Item	1970-71	1976-77	1977-78	1978-79	1979-80	1980-81
Million metric tons						
Total grains: ³						
Beginning stocks	205	138	195	191	218	191
Production	1,100	1,355	1,337	1,455	1,399	1,395
Total supply	1,305	1,493	1,532	1,645	1,618	1,586
Utilization	1,139	1,298	1,339	1,427	1,427	1,435
Ending stocks	166	195	191	218	191	151
Stocks as a percent of use	(15)	(15)	(14)	(15)	(13)	(11)
World trade	109	156	166	173	199	206
Oilseeds: ⁴						
Beginning stocks	7.1	10.5	8.1	8.6	8.6	16.9
Production	56.0	67.0	78.6	83.4	96.4	86.4
Total supply	63.1	77.5	86.7	92.1	105.0	103.3
Utilization	57.0	69.4	78.0	83.4	88.2	91.8
Ending stocks	5.1	8.1	8.6	8.6	16.9	11.5
Stocks as a percent of use	(8.7)	(11.6)	(11.1)	(10.4)	(19.2)	(12.5)
World trade	24.7	33.9	39.1	41.0	46.3	45.6
Million 480-lb bales						
Cotton:						
Beginning stocks	22.2	24.0	20.7	24.3	21.7	21.5
Production	53.7	57.4	64.1	60.1	65.6	63.7
Total supply	75.9	81.4	84.8	84.4	87.3	85.2
Utilization	56.1	60.9	61.0	63.0	65.5	64.8
Ending stocks	20.9	20.7	24.3	21.7	21.5	20.5
Stocks as a percent of use	(37)	(34)	(40)	(34)	(33)	(32)
World trade	17.7	17.6	19.2	19.8	22.7	20.3

¹ Preliminary. ² Projected. ³ Including milled rice. ⁴ Soybean meal equivalent.

Despite the tight supplies, global consumption of grains will probably be the second highest ever, exceeding production for 1980-81 by a wide margin. Consumption will probably decline in the United States, but usage is projected to rise in the rest of the world where demand is less sensitive to price.

We expect, then, the largest drawdown in world grain stocks since 1972. The global carryover will probably drop from the 191 million tons brought into this year to 151 million by the end of the 1980-81 season. The ratio of stocks to consumption—a critical factor in price determination—is expected to drop below 11 percent for the first time since 1974-75, well below the fairly comfortable ratio of 15.3 percent 2 years ago.

It is worth noting that, even with its sharp drawdown, the United States remains better supplied than the rest of the world. The projected 1980-81 U.S. grain stocks-use ratio of about 16 percent will still be well above its 1973-74 low of 12½ percent. In the rest of the world, the stock-use is projected at 8 percent for 1980-81 compared with 11 percent in 1973-74.

Though the present world grain situation means higher prices, it does not suggest widespread food shortages. In fact, the food grain situation is not nearly as tight as that for feed grains. The world wheat harvest in 1980-81 is shaping up to be the second largest ever and should facilitate record consumption levels with a stock drawdown of less than 7 million tons. We also expect records for both production and use of rice globally this year, with no appreciable reduction in stocks. The global stock-use ratio for wheat should decline from 18

percent to about 16½ percent, and the rice ratio will hold steady around 9½ percent.

U.S. wheat production was record large in 1980 and will support gains in domestic use and record exports with no decline in stocks. Moreover, indications now point toward record winter wheat plantings here which raises the prospect of another big U.S. wheat crop in 1981. U.S. wheat prices should continue their rebound this marketing year with the 1980-81 seasonal average expected in the \$3.95-\$4.25 per bushel range.

U.S. FARM PRICES

Crop	1978-79	1979-80	1980-81 forecast
Wheat (dollars per bushel).....	2.98	3.82	3.95-4.25
Corn (dollars per bushel).....	2.25	2.50	3.35-3.75
Soybeans (dollars per bushel).....	6.66	6.25	8.60
Rice (dollars per hundredweight).....	8.16	10.60	10.00-11.50
Cotton (cents per pound).....	58.4	62.6	

With a tighter feed grain situation this year, the United States and some other countries will have to make adjustments in their livestock production plans. World feed grain production will be down about 3 percent from last year's, but consumption is expected to be record large—some 33 million tons above the 705-million-ton harvest. The drawdown in global feed grain stocks, from 87 million tons to 54 million, will be the largest on record and will drive the stocks-use ratio from 12 percent down to 7 percent.

Feed grain production outside the United States is forecast to increase fairly substantially in 1980-81, led by gains in the Soviet Union, Western Europe, and Canada, plus a projected increase for Argentina, the Southern Hemisphere's leading feed grain exporter.

The United States began the 1980-81 season with its largest feed grain stocks in 16 years, but will end the year with its smallest since 1975-76 as the carryover falls from 52 million tons to 21 million. The farmer-owned reserve of feed grains, which stood at 17.5 million tons coming into this year will probably be empty by the end of 1980-81.

With a squeeze on livestock producers, domestic feed use is likely to drop about 9 million tons this year, to 126 million, but still well above the 1974-77 average of 113 million tons. Even so, we project that the United States will register its sixth straight record volume of feed grain exports, reaching 74 million tons in 1980-81. This growth reflects foreign commitment to support livestock industries despite slowing economic growth and higher world feedstuff prices.

In the wake of the short U.S. crop, producer prices for corn have risen rapidly in the past several months, averaging \$3.03 at the farm in October compared with \$2.36 in April and \$2.41 last October. The average price for 1980-81 is likely to run in the \$3.35 to \$3.75 range, well above the \$2.50 per bushel for 1979-80. Though competition for acreage will be keen this year, the improved price picture is virtually certain to expand corn plantings in 1981. With a return to more normal yields, some growth in domestic and foreign requirements can be met.

Oilseeds

Even more so than in the grain situation, a major drop in production in the United States is the key factor in this year's oilseed outlook.

World oilseed production is off 10 percent, with the drought-reduced U.S. soybean harvest accounting for virtually all of a 13-percent drop in world soybean production.

Higher oilseed prices, particularly for soybeans, and some slowing in livestock sector growth will cut the phenomenal rate of global consumption in 1980-81, though we will still see about a 4-percent gain. World oilseed use grew an average 5½ percent annually during the 1970's, including a 7-percent increase in 1979-80.

As for grains, too, large U.S. stocks of soybeans at the outset of 1980-81 will support further gains in consumption. U.S. soybean stocks, which account for most of the world's, will be drawn down almost to a half of their record 1979-80 carryout record of 9.8 million tons. The U.S. soybean stock-use ratio will also be nearly halved, to 9 percent, compared with a low in 1972-73 of less than 5 percent.

The short U.S. crop is forcing the first cutback in domestic use in 4 years and the first export decline in 6. Producer prices here are rebounding substantially from their depressed 1979-80 average of \$6.25 per bushel to around \$8.60 in 1980-81. The October average farm price, at \$7.82 per bushel, was more than \$2 above April's. The stronger prices are, however, unlikely to prompt much expansion in soybean plantings in 1981, since prices for corn and other grain crops have increased relatively more.

The peanut situation has tightened tremendously, especially in this country. U.S. production of edible peanuts this year will only be a half of last year's—the drought and crop disease are the reasons.

Though the world peanut crop is down just slightly and only 5 percent of the peanuts produced each year are traded, a shortfall of this magnitude in the largest exporting country has driven prices way up: Prices in Europe in late October were running around \$2,000 per ton, compared with \$1,200 a month before and a \$925 average for all of 1979-80. Prices should settle down later but will probably average 75 percent above 1979-80's for the year.

U.S. peanut exports will probably be half their 1979-80 level, with India moving in to make up some of the difference. With a big stock drawdown, U.S. domestic use should drop less than a quarter. With supplies here this tight, the U.S. International Trade Commission is studying a request for a relaxation of peanut import quotas.

Cotton

World cotton production, at 63.7 million bales, is down about 3 percent in 1980-81: again the main reason is a substantial drop in the United States where output fell 23 percent. World consumption is expected to decline only marginally, however, and trade is projected to drop because of reduced needs in major importing countries and a much smaller U.S. export availability. Global ending stocks are projected to fall about a million bales to 20.5 million, the lowest level in nearly 20 years.

In the United States, cotton stocks may dip another 200,000 bales from the low level of August 1979. With the short crop, there will be a sharp cutback in exports, smaller domestic mill use and higher prices. U.S. farm prices averaged 78 cents per pound during August-October, a third higher than a year earlier. Even if 1981 cotton plantings slip

below 1980's relatively high level because of sharper price increases for competing crops, average yields would mean a significantly larger crop in 1981.

Sugar

World sugar prices have nearly tripled over the past year and are unlikely to decline soon with 1980-81 output only slightly above last year's reduced crop of 84 million tons and below the 1978-79 record 91-million-ton harvest. Global consumption this season may gain slightly, limited by the high prices, and stock levels will probably fall again this year.

Livestock

Favorable livestock/feed price ratios in 1978 and early 1979 prompted many U.S. farmers, pork and poultry producers especially, to expand production sharply through the first half of 1980. This created an excessive supply situation that depressed prices for all meats and put producers in a cost-price bind, particularly when feed costs started to rise sharply this summer. Pork and poultry producers had already begun to cut back on output when summer heat stress moved in and cut the near-term supplies. Though producer prices have begun to improve, further improvement will depend on the extent of the current upswing in feed costs relative to livestock and poultry prices.

U.S. LIVESTOCK PRODUCTION AND PRICES

	1976	1977	1978	1979	1980	1981 forecast
Beef:						
Production (million pounds).....	25.7	25.0	24.0	21.3	21.4	21.5
Prices (dollars per hundredweight).....	39	40	52	68	68	78
Pork:						
Production (million pounds).....	12.5	13.1	13.2	15.3	16.3	14.8
Price (dollars per hundredweight).....	43	41	48	42	40	55
Broilers:						
Production (million pounds).....	9.0	9.2	9.9	10.9	11.1	11.4
Price (dollars per hundredweight).....	40	41	45	44	47	55
Eggs:						
Production (million dozen).....	5.4	5.4	5.6	5.8	5.8	5.7
Price (cents per dozen).....	70	63	62	68	65	78
Milk:						
Production (billion pounds).....	120	123	122	124	128	129
	9.7	9.7	10.6	12.0	13.1	14.4

Cattle prices strengthened considerably this summer from their depressed levels during the first half of 1980. Average prices for Choice steers topped \$70 in the third quarter, compared with about \$65 during January-June 1980. However, with seasonally larger meat supplies this fall prices have slipped to the midsixties. Prices are expected to strengthen near the end of this year and probably continue strong through much of 1981 because of reduced supplies of competing meats. Average steer prices next year could move into the upper seventies.

U.S. cattle inventories at the beginning of the new year could move slightly above this year's 111 million. Because of lower cattle prices this year and poor grazing conditions, inventory gains in 1981 may be limited.

Beef production is up slightly in the last half of this year relative to a year ago and may be slightly higher in 1981, though the timing of

increase is difficult to predict. Grazing conditions and feed costs during the next few months will have a significant impact on production patterns. If large numbers of cattle go to slaughter directly off pasture this fall and winter it will increase near term beef supplies but reduce production later in 1981. A mild winter and improved winter grazing conditions, on the other hand, could permit the holding of more cattle over the winter and bolster beef production next spring.

Heavy slaughter in the first half of 1980 depressed hog prices and worsened losses to hog producers. Farrowings dropped sharply in the third quarter of this year and are expected to be down in the fourth quarter as well, pointing to reduced pork output and higher hog prices in 1981. First-half 1981 prices could move to around \$50, about \$17 above depressed levels of first-half 1980. If farrowing this winter and next spring continue down as expected, this could lead to hog prices in the upper fifties in the second half of the year.

Pork production could be off 8 to 10 percent in 1981. With tight competing meat supplies in prospect, retail pork prices will probably average some 25 to 30 percent above the 1980 average.

Wholesale nine-city broiler prices in the first half of 1980 ran more than a tenth below the year ago level. They rebounded to 53 cents in the third quarter as production fell. Prices are weakening somewhat in the fourth quarter. But with production expected near the year-earlier rate in the first half of 1981, prices should move back into the low to midfifties. Despite year-to-year increases in broiler output during the last half of 1981, prices may strengthen due to improved consumer demand and reduced supplies of red meats.

Dairy

U.S. milk production this year will be the largest on record and about 3 percent greater than in 1979. This expansion results from continued gains in output per cow and increased cow numbers. Demand for dairy products has been weak this year and commercial use is lagging. The weak demand combined with large supplies resulted in large USDA purchases to support milk prices. Purchases in the first 9 months of 1980 on a milk equivalent fat basis totaled 7.35 billion pounds, compared with 1.31 billion in 1979.

Further gains in U.S. milk production are expected in 1981 but the rate of increase is likely to slow as sharp increases in feed costs lead to less favorable milk-feed price relationships. Demand for dairy products may strengthen some in 1981, particularly if cheese prices become more competitive with meats. Large gains in commercial use are not expected, however, and USDA purchases under the price support program will once again be large.

TRADE OUTLOOK

Despite the reduced output in the world's leading exporting countries and the slowing economic growth in most nations, world grain trade is continuing to expand. Combined world trade in wheat, feed grains, and milled rice will probably top the 200-million-ton mark for the first time in fiscal 1981.

In contrast to the grain situation, where many nations isolate their markets from world price levels, higher prices and somewhat slacken-

ing demand will probably rein in the growth in world oilseed and cotton trading. Exports of both commodities are forecast to be down slightly from 1979-80 record levels.

U.S. agricultural exports hit their 10th straight record in fiscal 1980, surpassing \$40 billion for the first time. Despite the disappointing harvests here this year, we expect exports to expand further in 1981; they could run as much as a fifth above this year's.

Fiscal 1980 saw some also important shifts in U.S. agricultural export patterns. Though the suspension of sales to the Soviets that began last January has limited our shipments to that country we have made some big gains in a number of areas, especially in the Chinese and Mexican markets. Exports continued to expand to the rapid-growth developing countries of East Asia and North Africa. U.S. exporters also significantly increased sales to some of their traditionally major markets—Western and Eastern Europe, and Japan.

The expansion in the Chinese and Mexican markets this year is particularly worth noting. China has been a relatively erratic buyer and Mexico small but growing. Both have the potential of considerable further growth—China because of its enormous population—a fifth of the world's—and Mexico because of its expanding oil wealth. Both countries appear to be committed to improving the diets of their people and are looking to imports to assist them on this goal.

The fluctuations in China's imports from the United States over the past several years—ranging, for example from no wheat purchases in 1977-78 to a projected 6.5 million tons in 1980-81—will be ironed out over the next 4 years by the bilateral agreement signed last month. The agreement will put minimum Chinese grain purchases through 1984-85 at 6-9 million tons.

The United States also entered a bilateral arrangement with Mexico in 1980, though the period covered was only 1 year. The United States may supply Mexico with as much as 10 million tons of agricultural commodities by the end of calendar 1980, 2½ times the volume Mexico purchased from the United States in 1979.

The role of bilateral arrangements in U.S. agricultural trade should not, however, be overemphasized. Trade with the three agreement countries—U.S.S.R., China, and Mexico—accounted for only about one-eighth of the value of 1980 U.S. agricultural exports and all the actual trading on our side has remained in the hands of private U.S. exporters. Agreements, particularly in the case of the U.S.S.R. and China, do help remove some of the uncertainties involved in dealing with nations with large state trading systems.

The longer term outlook for U.S. agricultural trade is strong. Rising population and income throughout the world, along with the desire in many countries to upgrade diets with more meat, milk, and eggs, assures the United States of growing demand for its agricultural goods, especially feedstuffs.

Over the past 20 years, grain production outside the United States increased an average of 21 million tons per year. Consumption during that same period rose 25 million tons annually. With the foreign production/consumption gap growing at a pace of 4 million tons per year, the U.S. predominant role in global agricultural trade seems assured. However, continued problems with restrictive trade policies

in many nations and the inevitable fluctuations in commodity output and economic growth will pose a series of challenges for the United States and the other major agricultural nations in the years ahead.

Problem Areas

While conditions throughout the world will be tight next year there are a few areas where problems are particularly severe. In Sub-Saharan Africa a chronic food problem is worsening; the Soviet Union and Poland have a history of sporadic food shortages and more problems are looming.

Sub-Saharan Africa is the only region in the world where per capita food production has actually declined in the past two decades and it is the most serious food-deficit area on the globe. Per capita calorie intake is below minimal nutritional requirements and without basic structural changes, the potential for significant production increases in the area is minimal. U.S. shipments of food aid to Sub-Saharan Africa in fiscal 1981 are projected at 1.7 million tons of total concession sales and grants, roughly a fourth of our expected Public Law 480 shipments this year.

Consecutive disappointing grain harvests, plus the difficulties in procuring needed imports that resulted from the U.S. sales suspension, have virtually halted ambitious Soviet plans to expand their livestock industry. Soviet leadership has been coming under considerable pressure to increase availability of meat, milk, and eggs to consumers whose per capita meat consumption, at 57 kilograms, is about half that of U.S. consumers and well below most of their counterparts in Eastern Europe. Czechoslovakia and Poland, for example, maintain per capita meat consumption around 70 kilograms.

The food outlook in Poland is the bleakest in some time. Severe flooding there cut potato production 38 percent and sugar beet output a fourth and prevented any significant recovery from last year's poor grain harvest. The Poles will have to revert this year from a net exporter of sugar and meat to a net importer of both and will need to import more grain—8 million tons—than ever before.

The added imports will worsen Poland's already dire financial position. Virtually all their food imports for the past several years have been on a credit, rather than cash basis, and most of their minimal export earnings—mainly from coal—go to payment of credits. To exacerbate their problems even further, the Poles face their additional food needs this year with even less foreign exchange than usual: Last summer's labor strike choked off much of their export shipments. Ironically, low food supplies was one of the major catalysts of the strike action.

OUTLOOK FOR FARM INCOME

Increases in commodity prices over the past couple of months have boosted cash receipts to producers somewhat, but not enough to prevent a substantial decline in net farm income during calendar 1980.

About a 13-percent increase in crop receipts for the year and a slight improvement in livestock receipts are contributing to roughly a 3-percent rise in gross income. But an 11-percent surge in production expenses, led by energy, short-term interest costs and fertilizer, will

erase the income gains. As a result, net farm income will drop 20-25 percent from last year's \$31 billion, to \$23-\$25 billion for 1980. It is worth noting, though, that the actual cash flow to farmers will be down less than 10 percent in 1980—much of the decline in the net income figure in the result of adjustment for the large farm inventories left from the record 1979 crops.

Given the current strength in commodity prices, the likelihood that a return to more normal yields next year will increase crop production, and the expectation that livestock receipts will be up, the outlook for 1981 farm income is much brighter than this year's. Gross farm income will show a substantial rise, led by a sharp advance in prices and receipts from livestock products.

Production expenses will continue to rise, especially for the farm origin inputs of feeder cattle and feed, but the lower rate of inflation in the general economy should moderate price increases for manufactured inputs and hold down interest rates. With gross income rising more than production costs and the likelihood of some rebuilding in farm inventories, net farm income could then increase substantially, climbing into the \$27-\$32 billion range. With good harvests and no major inflationary jolts next year, we could see net farm income return to the 1979 level.

U.S. FARM INCOME, 1972-80

[In billions of dollars]

	1973	1972	1974	1975	1976	1977	1978	1979	1980 forecast
Gross income	71.0	98.9	98.3	100.3	101.8	108.1	126.9	149.9	153-156
Total production expense	52.3	65.6	72.2	75.9	83.1	90.3	100.8	118.6	131-133
Net farm income ¹	18.7	33.1	26.1	24.5	18.7	17.8	26.1	31.0	23-25

¹ After inventory adjustment.

OUTLOOK FOR RETAIL FOOD PRICES

Record meat output coupled with depressed meat prices in the first half of the year—reflecting livestock prices below costs of production—permitted heavy consumer buying and kept food price levels stable. Although they increased this summer, for all of 1980 retail food prices are forecast to average about 9 percent higher, well below the general rate of inflation.

Livestock producers' reaction to the low prices, however, coupled with the effects of the drought, drastically changed the retail food price picture for the rest of 1980 and the first half of 1981. Cutbacks in production of pork and poultry pushed up prices of these meats, and beef prices rose accordingly despite a slight increase in third-quarter output. The main source of the 13-percent annual rate of increase in retail prices during the July-September period shifted then from marketing costs to rising producer prices.

The rate of food-price increases may dampen some during the fourth quarter, though we are now seeing some passthrough of higher raw sugar prices in retail prices for processed food products. Prices for

grain ingredient products will also be rising. For the year, food prices will probably end up averaging about 9 percent above 1979's, substantially below the overall inflation rate. Rising marketing costs are apparently responsible for more than half of the 1980 increase, with farm costs adding slightly more than a fifth.

CONTRIBUTIONS TO CHANGES IN RETAIL FOOD PRICES

Item	1972	1973	1974	1975	1976	1977	1978	1979	Forecast	
									1980	1981
Contribution:										
U.S. farm value-----	3.3	11.9	2.7	1.8	-1.6	0.1	5.1	3.7	1.9	4-6
Fish and imports-----	.2	1.0	2.5	1.9	1.2	4.1	1.3	1.2	2.2	2-3
Marketing costs-----	1.0	2.3	9.7	4.6	2.5	1.8	4.1	5.9	4.6	4-6
Total (percent change)-----	4.5	15.2	14.9	8.3	2.1	6.0	10.5	10.8	8.7	10-15

The way that livestock producers adjust their production the remainder of this and next year will be a major determinant in the movement of retail food prices in 1981. It is likely that meat production will be off next year and prices up with much lower pork output more than offsetting slight increases for beef and poultry.

The retail food price increase for 1981 will probably fall in the range of 10 to 15 percent. Should severe weather again damage global crop, and livestock production and further surges in inflation push up marketing costs, we would expect to see a food price rise in the upper end of the range. On the other hand, good weather patterns and some easing in the rate of inflation would keep us toward the lower end.

AGRICULTURAL TRADE OUTLOOK

(By Thomas R. Saylor, Associate Administrator, Foreign Agricultural Service,
U.S. Department of Agriculture)

At the Outlook Conference a year ago we were looking back on what had been another record year for U.S. agricultural exports and forecasting substantial gains for the new year.

The forecast leaned quite heavily on an expected increase of at least 10 million tons in exports of U.S. wheat and corn to the Soviet Union. Less than 2 months later, the Soviets invaded Afghanistan and our shipments to the Soviet Union were halted at 8 million tons. This was a staggering 17 million tons less than our predicted exports to that destination.

So what happened after that? U.S. grain exports rose to a record level, soybean exports reached new heights, and total U.S. agricultural exports registered unprecedent growth to \$40.5 billion. This is \$2.5 billion more than last November's forecast and over \$8 billion more than U.S. exports in the previous year—the largest dollar gain in our trading history.

I think this experience points up two things: (1) the hazards of standing up here in November and trying to predict what will happen in agricultural trade by next October, given all the noneconomic factors that can affect trade; and (2) the global scope of import demand for agricultural commodities.

This is November, and here I am again, predicting that this global demand will continue, and that, despite a sluggish world economy and despite short U.S. coarse grain and soybean harvests, U.S. agriculture will put a 20-percent gain on top of last year's record for an export total in fiscal year 1981 of about \$48.5 billion.

Price will be the principal factor in the increase, but we expect further growth in volume of about 4 percent to about 170 million tons. An increase in grain volume of about 7 million tons will more than offset the slight decline anticipated in shipments of soybeans and products and a substantial drop in cotton volume.

We look for export price levels in the 1981 year to average about 35 percent higher than last year for corn, sorghum and soybeans, and probably 8 percent more for wheat.

This upward trend is evident in other export commodities, and we expect value gains in fiscal year 1981 for all export categories except cotton, which is forecast to decline substantially, largely because of a drop of about 20 percent in U.S. production.

In contrast to the export picture, agricultural imports this year are forecast to show relatively little growth. They are forecast at about \$18.5 billion, as sharply higher sugar import value is partially offset by a decline in the value of coffee imports. Price is the primary factor in both estimates.

The result will be a \$7 billion increase in the U.S. agricultural trade surplus to about \$30 billion. This will be enough to offset probably about one-half of our petroleum import bill, providing a substantial lift to our international trade account. It points up the nationwide importance of a sound agricultural export trade and the need to keep it growing.

The record of the past 10 or 12 years has been phenomenal. Under the impact of increased world demand, stimulated by international monetary changes, and assisted by trade-oriented public policies, U.S. agricultural exports by the end of this fiscal year will have increased by almost five times over the goal set in 1970 of \$10 billion in farm exports by the end of that decade.

As we approach \$50 billion a year in these exports, and what some say may be the near limit of our export capacity, it is time to assess where we are in agricultural trade and where we want to go.

Increasingly, we may face policy decisions which can have a substantial impact on current and long-term trade flows. The most dramatic example—perhaps the most dramatic in recent history—and one with implications well beyond the immediate consequences, was the embargo on sales to the Soviet Union above the level of 8 million tons provided in our bilateral grain supply agreement.

For the Soviet Union, coming off a very short 1979 crop, the embargo forced drastic changes in buying and shipping practices and put heavy pressure on Soviet grain stocks in order to maintain livestock inventories in the face of disrupted supplies.

With the grain crop down again this year to an estimated 185 million tons, the Soviet Union will probably go through one of the most traumatic adjustments in recent years. While livestock numbers have generally been maintained and in the case of poultry actually increased, severe adjustments in hog inventories are likely this fall and some reductions also are expected in poultry flocks. Given current forage conditions, distress slaughter of cattle is not anticipated. However, increased hog and poultry slaughter this year can only be achieved at the expense of meat availabilities in future years.

Soviet grain imports in 1980-81, currently forecast at 31 million tons, will not change substantially from 1979-80. Until recently, logistical constraints arising largely from changes in sources of supply appeared to be more of a limiting factor than availability of grain on world markets. However, the tighter world grain situation is now also a consideration.

Those are the immediate consequences of the embargo. Its merit became an issue in the 1980 election campaign and its future is yet to be decided.

The broader consequence of the embargo has been to bring to the fore the issues of supply agreements, export controls and, at bottom, the whole question of the Government's role in U.S. agricultural trade.

With a few exceptions, such as the Soviet matter, U.S. agricultural exports have been permitted to grow with minimal Government regulations to nearly \$50 billion and 170 million tons a year. The question is, will this market-oriented approach be continued in a world where grain supply and grain demand are trending toward closer balance with each passing year?

By the end of the current marketing year, world wheat stocks are expected to fall to 16.1 percent of consumption, the lowest since World War II. The previous postwar low was 17.5 percent in 1972-73. Coarse grain stocks will drop to 7.9 percent of utilization, again well below the previous low of 8.8 percent in 1973-75.

It is now apparent that a much tighter balance will exist between supply and demand for grains and other basic agricultural commodities in the coming decade. During the 1960's, foreign production of wheat and coarse grains lagged use by about 30 million tons annually, but both production and use were growing at about the same rate—22 million tons annually. That changed dramatically in the 1970's, when foreign use rose by about 26 million tons a year while the increase in production dropped to 19 million tons a year.

This means, of course, that the shortfall between foreign production and utilization widened significantly during the 1970s; and if the present trend continues, that gap could average around 150 million tons during the mid-1980's.

In this situation, the world has grown increasingly dependent on U.S. agriculture to maintain its requirements. This is clear from the figures on the U.S. share of world trade. The United States accounted for 36 percent of the world's wheat trade in 1970 and it supplies 46 percent today. The U.S. share of coarse grain trade has risen from 43 percent in 1970 to 73 percent today, and that of rice from 16 percent to 24 percent.

The dynamic export trade of the early 1970's produced a major turn in U.S. farm policy. The policy theme in the 1950's and 1960's was managing excess capacity. Export market expansion was emphasized to utilize previously unused production capacity. Public Law 480 was born, and with it the cooperator and other export expansion programs of the Foreign Agricultural Service. Export subsidies were used to offset generally higher U.S. domestic prices in establishing export markets.

By the 1970's, the theme of agricultural policy had become managing year-to-year variability in supply—a variability largely driven by foreign demand. Stockpiling, largely through a farmer-owned reserve, became the cornerstone of farm policy—and we might well wonder where the world food balance would be today if the U.S. farmer had not adopted that policy of reserves.

As conditions change, the 1980's may very well be characterized by attempts to limit, rather than stimulate, the growth in real prices for agricultural commodities by balancing domestic markets through regulation of export flows. Such a policy was put into effect with the soybean export embargo of 1973, and was abandoned soon after.

Similarly, restraints on trade with the Soviet Union were imposed for economic reasons in 1974 and 1975. However, attempts to control inflation by regulating exports have not been effective in achieving even this short-term objective, and may be counterproductive to maintaining a balance in the food economy over the long term.

Over the year, it is apparent that the impact of the embargo on commodity prices was minimal. This reflects the truly global nature of export demand, which I cited at the outset of this talk, and the interchangeability of markets, with what seems to me to be important implications for the question of bilateral trade agreements.

Clearly, and as should be expected, restricting supplies to certain markets does not reduce the overall demand for exports. As the 1980 trade figures show, while other suppliers demonstrated a limited capability to fill a market we had abandoned, we filled markets that would otherwise have been served by Canada, Australia, or other foreign suppliers, and our total export volume was not significantly changed.

Applying this experience to the bilateral concept indicates to me that, in general, agreements regulating trade between two countries are unlikely either to increase or decrease total world trade and, therefore, demand for U.S. farm commodities. However, the bilateralization of trade in guaranteed supply-purchase agreements, does lead to greater potential instability of trade to the extent that a large share of the world's exportable supply becomes committed through entitlements. In a situation of tight supply, those countries that do not have all their requirements covered by a supply commitment will have to bid for their needs on the residual world market. And because this market will be reduced by the amount that is committed under bilaterals, it will become considerably more volatile than if the total exportable supply were open for bid.

Having said that, and in light of my personal involvement in the Chinese and Russian agreements, I would be quick to point out certain virtues of these two arrangements. The primary one is that of better information on import requirements of two large and variable markets for agricultural commodities. Both are closed systems about which crop and demand information is limited. Better information on ultimate demand will contribute to more orderly market adjustments and reduce the potential for direct intervention in trade.

There are similarities between the agreements, but there also are differences. In the Soviet case, the United States may limit exports at 8 million tons unless prior agreement is reached on a higher level of trade. With the Chinese, only notification is required if purchases above 9 million tons are intended. The Chinese agreement also guarantees that China will not be discriminated against in the application of short-supply controls.

Each agreement serves a specific purpose. But do these agreements suggest a new U.S. export marketing strategy characterized by bilateral agreements? From an economic rationale the answer has got to be "no." As I pointed out earlier, bilateral agreements in themselves will not increase or decrease trade in the circumstances we anticipate in the years ahead. Rather, they may only destabilize world trade in situations of short supply. Furthermore, any supply assurance sought under one agreement would certainly be sought by all. I believe we are unlikely to choose to so discriminate between export customers.

What about multilateral arrangements in the context of tight supply? The efforts to negotiate an international wheat agreement incorporating nationally held grain reserves failed primarily for one reason: Because importing countries extrapolated the supply balance prevailing at the time to the situation of oversupply which characterized the 1950's and 1960's. Anticipating a buyer's market, they were unwilling to make the serious financial commitments necessary to insure an adequate reserve to protect against expected fluctuations in supply.

Now we are in a seller's market, and the interest of importing countries is likely to become somewhat stronger. While we would be unable

to put a stabilizing scheme into effect, the rules that would permit its establishment could be agreed upon to come into play during the next abundant supply/short supply cycle. Such an arrangement could diffuse the burden of stabilization, which is now borne primarily by the United States, and would help avoid abrupt intervention to regulate trade.

This will not happen. The exporting nations will not compromise their opportunities in a seller's market. Nor will finance ministers anywhere obligate the resources necessary to have a viable stabilization scheme. In fact, I believe that in the International Grains Arrangement of 1967, we have seen the last grains agreement incorporating economic provisions.

I believe the future for any international commodity agreement incorporating economic obligations is grim for several reasons. International commodity agreements work well until tested by economic forces. Without exception, commodity agreements will fail when confronted with any significant supply imbalance. They will fail, first, because the magnitude of supply imbalance for most basic agricultural commodities requires substantial resources to maintain adequate stocks or to effect the consumption adjustments to redress the supply imbalance; and second, because governments are unwilling to commit the necessary level of resources or make the domestic policy changes needed for any significant adjustment in consumption.

And without those kinds of agreements, it will be up to those markets which are open to the world, as the United States is for grains and oilseeds, to make the adjustment in consumption or to establish the stabilization schemes to balance world supply.

It is such a concern that will give rise to pressures to establish in the United States a differential between the domestic and international market for basic agricultural commodities, either through an export tax, which is preferable but may not be constitutional, or through direct regulation of the quantities of domestic supplies moving into export trade—in other words, export controls.

I believe that such a policy would be shortsighted. I believe—and I believe strongly—that the only means of assuring long term supply and reasonable food costs in the United States is to permit a substantial increase in the real price of agricultural commodities. This will mean that we will have to tolerate increases in the proportion of income Americans spend for food, which—at less than one-fifth—still remains the lowest in the world. Our livestock industry and other sectors that depend on agricultural commodities as a production input also will be faced with increased costs.

I do not believe America has reached its agricultural production potential. As we have been surprised in recent years by the capacity of American agriculture to respond to increased incentives, we may be surprised in the future. Looking at yet untapped yield potentials, and the limited application of certain intensive cultivation opportunities, I am convinced that U.S. agriculture can and will respond to a stable long term price incentive. Having been employed by both the executive and legislative branches of Government over the last 10 years, I do not believe the level of that incentive can be a public sector decision. It is a market decision.

The United States has developed the most efficient food and fiber system in the world. It is efficient for one reason—because investment

in agriculture and its marketing systems has been economically attractive. Contrast that with the pattern of resource constraints in those systems where agricultural investments are controlled primarily by the Government or a quasi-governmental agency. What would happen, for example, if investment in a grain terminal had to be weighed against investment in a missile silo, a child care program, or a new Government office building? Or what would be the effect on our agricultural productivity if commodity prices were restrained at a level determined by short-term political expedience?

Our system must also be recognized for its responsiveness to increasing consumption requirements of the world. As prices have risen, our producers have moved to increase their output. Our marketing system has invested in the capacity to handle the needs of both the domestic and international economy. Unlike certain nations privileged with control over a basic resource, we have not entered into arrangements with other producing countries to raise prices by restricting supply. We have maintained a system that offers foreign customers access to our market on the same basis as domestic consumers.

I believe our marketing system will survive. It will survive despite the most intense pressures over the next decade because it is a proven system. It is the only system that will maintain a food and fiber supply necessary to meet the increasing demand, and foster the political stability of the international community.

U.S. AGRICULTURAL EXPORTS—VALUE BY COMMODITY

[Fiscal years]

Commodity	1978	1979	1980	Forecast 1981
Billion dollars				
Grain and feed.....	13.711	13.634	18.671	24.2
Oilseeds and products.....	7.453	8.692	10.017	12.2
Cotton, including linters.....	1.707	1.910	3.033	2.2
Tobacco.....	1.132	1.292	1.349	1.4
Fruits, nuts, and vegetables.....	1.880	2.066	2.699	3.0
Sugar and tropical products.....	.580	.733	.908	1.1
Livestock products.....	2.341	3.160	3.096	3.6
Dairy products.....	.156	.120	.161	.2
Poultry products.....	.332	.368	.547	.6
Total.....	27.291	31.975	40.481	48.5
Volume by commodity, ¹ million metric tons				
Wheat.....	31.813	31.340	36.066	40.2
Wheat flour.....	1.021	.877	.883	1.0
Feed grains.....	55.545	59.504	71.159	74.2
Rice.....	2.276	2.397	2.955	3.1
Other grain products.....	.943	.963	1.074	1.1
Feeds and fodders.....	3.603	4.304	5.651	7.0
Soybeans.....	19.686	20.194	23.833	22.5
Soybean meal.....	5.516	5.996	7.175	6.5
Other oilcake and meal.....	.324	.294	.425	.4
Soybean oil.....	.933	1.059	1.220	1.1
Other vegetable oils.....	.541	.460	.394	.6
Sunflower seed.....	.906	1.342	1.927	1.9
Cotton, including linters.....	1.378	1.396	2.047	1.3
Tobacco.....	.272	.287	.283	.3
Fruits, nuts, and vegetables.....	2.904	2.808	3.109	3.3
Beef, pork, and variety meats.....	.340	.326	.345	.4
Poultry meat.....	.194	.208	.320	.4
Animal fats.....	1.281	1.276	1.509	1.4
Other.....	2.394	2.406	3.502	4.1
Total.....	131.870	137.437	163.877	170.5

¹ Shown in actual export tonnages not converted to product equivalents. Excludes animal numbers and some commodities reported in cases, pieces, dozens, liquid measures, etc.

TRADE AND DEVELOPMENT POLICY ISSUES FOR THE EIGHTIES

(Dr. Dale E. Hathaway, Under Secretary for International Affairs and Commodity Programs, U.S. Department of Agriculture)

I appreciate this opportunity to discuss some of the policy issues that will affect agricultural trade and development during the 1980's. I would like to devote most of my time discussing those issues which we think will have a major influence on U.S. agriculture in the years ahead—some of my points will be new and others you have been exposed to before.

The basic points which I would like to make today concern: (1) The impact of changing trade patterns on protectionism, adjustment and instability, (2) the changing role of Government in agricultural trade activity, and (3) the relationship between trade and development.

IMPACT OF CHANGING AGRICULTURAL TRADE PATTERNS ON PROTECTIONISM, ADJUSTMENT, AND INSTABILITY

Having recently completed a long and arduous round of multilateral trade negotiations, major trading countries are in unanimous agreement that there will be no new MTN round in the foreseeable future. A major portion of the results of the just completed MTN's was concerned with expanding and making more comprehensive the rules by which trade will be conducted in the years ahead. These rules, however, embodied in the new and expanded Codes now incorporated as part of the GATT, pertain primarily to trade by developed market economies.

Perhaps more importantly, the decade ahead will focus on the discussion of what action we can take that will not increase trade problems. There is a delicate balance of effort such that any action we take will not adversely affect trade flows.

Thus, in the coming decade, we must concentrate on trying to make the GATT work more for agriculture than it has in the past. We recognize that some countries are pushing to have GATT rules applied equally to industrial and agricultural products. However, the realities are that the GATT cannot be applied in the same manner for industrial and agricultural products, because in fact some of the rules themselves are different. For example while subsidies are prohibited for industrial products, they are allowed for agricultural products under certain conditions. But there is an even more fundamental change in our trade relationships that has implications for the future effectiveness of GATT. Our pattern of agricultural export trade flows is shifting dramatically toward countries that use importing mechanisms that fall outside traditional GATT rules.

If one compares trade data for total cereal grain net exports for selected country groups since 1960, one can appreciate the tremendous

growth in two important groups—centrally planned economies and developing countries. In 1960–62, net imports for the centrally planned economies group (includes Eastern Europe, U.S.S.R., and People's Republic of China) were 3.2 million metric tons compared to 12.7 million for the developing countries, 5.8 million for Japan, 4.3 million for other Western Europe and 21.5 million for the EC-9. By 1970–72, a comparison of the change in net cereal grain imports for these country groups to 1960–62, shows that the centrally planned economies doubled their net import level to 6.5 million tons, the developing countries decreased their level to 8.9 million tons, Japan doubled their level to 10.3 million tons, other Western Europe declined about 5 percent to 4.1 million tons, and the EC-9 level decreased 40 percent to 13 million tons. During the decade of the 1970's world grain trade changed dramatically. By 1979–80, net cereal grain imports for the centrally planned economies had increased to 54.6 million tons—up 740 percent compared to 1970–72. The net grain imports for the developing countries increased 610 percent to 54.5 million tons, Japan increased their level by 131 percent to 23.8 million tons, other Western Europe increased 151 percent to 10.3 million tons, and the EC-9 decreased their level to 4.2 million tons—only one-third that in 1970–72. In the current 1980–81 year, we estimate net imports to decline some for all groups except Japan which is expected to have about the same level as in 1979–80.

Thus the proportion of total world net imports of cereal grains is and will continue to be tremendously influenced by the activities and decisions of centrally planned economies and the developing countries groups.

One must only look at these statistics to recognize that the role of centrally planned economies and LDC's is increasingly important with respect to the volume and proportion of total agricultural trade flows. All of the centrally planned economies and a very high proportion of Third World countries conduct their international trade through some form of state trading mechanism. State trading is carried out in such a way that the traditional trade policy instruments become irrelevant. That is, the state trading mechanism in many cases is not backed by a traditional market economy, in other cases it is disconnected from the domestic market by overt policy. Therefore in these situations, a traditional concept of supply/demand and pricing as well as trade discrimination and nontariff barriers are either irrelevant concepts or at best difficult if not impossible to measure. Thus, the complex and complicated GATT machinery that developed countries have invested so much time and so many resources in assembling is irrelevant for a large and growing component of international agricultural trade flows.

Moreover the increasing influence and activity of countries with state trading mechanisms coupled with a profusion over the past two decades of regional country groupings that provide, *inter alia*, preferential trade arrangements among members (EEC, EFTA, CMEA, Andean Pact, ASEAN, et cetera) has reduced substantially the comparative advantage basis for trade and the influence of traditional market forces in effecting domestic adjustment to changing world trade conditions. These trends toward further insulation of domestic economies from international market forces are likely to continue and

even intensify in the 1980's. As the influence of the centrally planned economies and LDC's is felt in the world market, the full burden of adjustment will fall on those countries which operate with a market economy, do not overly insulate themselves from the international market and are exporters. The United States is fast becoming the only major country left that fits the description.

In addition, the international market instability problem is intensifying. According to a recent ESS study, we note that in 1950 the instability was such that an estimate of U.S. export volumes would have a standard error of plus or minus 8 percent. In 1980, the estimated standard error had climbed to 12 percent and ESS estimates that in 1985 this standard error will be 14 percent. This increasing international market instability and the fact that an increasing portion of the burden is being forced on the United States will become increasingly intolerable to both U.S. consumers and U.S. producers.

GOVERNMENT'S ROLE IN TRADE ACTIVITY WILL CHANGE

What is the role of government in this changing trade environment? In the past, the GATT member governments established the rules of the game by which the exporting and importing nations would play in conducting their international trade. The trade itself, within the context of those rules, was carried out largely by the private sector. In the new situation, however, at least on one side of the transaction there is no private sector. Moreover, the state trading entities in many cases are reluctant to deal directly with the private sector on our side and insist upon government-to-government contact. Thus the traditional policy instruments for dealing with trade relationships among private trading systems are no longer effective. New policy approaches must be developed for dealing with state traders.

Another state trading issue not usually stated is secrecy versus relatively widespread or open information. We in the United States are fairly open about supply, demand, new sales, terms and timing of events information. In state trading countries such information is quite often suppressed. This, of course, helps tip the balance of market power to the state trader. A further complication arises from the lack of information when, for example, as a result of a trade complaint we attempt to determine whether subsidies are being applied. Even when information is available it is often assembled on a conceptual base that makes it not comparable to ours. Despite this difficulty one important result of bilateral agreements has been the increased information flow between governments.

We have spent much more time at relatively high levels in bilateral consultations on policies, both domestic and trade, on crop condition, stock position, export availabilities outlook and on discussing market and trade prospects with each of these state trading countries in turn.

One small example of the recognition, even within GATT of the need for a changing role by governments in the trade arena, was the establishment of the "Multilateral Agricultural Framework," a long title for a group of nine major agricultural trading countries that now sit down at my level about twice a year. This group discusses the trade situation, the anticipated changes in domestic policies that will influ-

ence the behavior of the international markets and attempt to talk through and head off issues before they become trade problems or trade disputes.

This shifting behavior of governments in response to the larger amount of trade flows with countries with state trading mechanisms does not satisfy the full range of activities that likely should make up the governments' role. For example, it does not address the issue of what international cooperative mechanism can be developed to handle this increasingly important international instability problem.

For many years the United States has been involved in international commodity agreements. Our participation, either actively or in their negotiations, has been an effort to support attempts to control or regulate variations in the international trade of these commodities. However, experience with international commodity agreements indicates that they have not worked well in the past perhaps because the framework for their development has been wrong. For example, the stock levels have been too low and the price ranges too narrow. The cocoa agreement has gone awry, the coffee agreement has had its troubles and the sugar agreement has most certainly not accomplished its objectives. Nevertheless, in the next 15 months, I suspect that there will be mounting pressure by grain importers to again negotiate a grains agreement. While commodity agreements have not achieved their objectives very well, even their negotiation is difficult. Negotiators simply cannot write rules to fit the needs and/or desires of 90 countries. Perhaps a solution would be to limit the number of countries sitting down at the negotiating sessions.

I would, however, go further and propose that those nations who count in world trade and those who contribute significantly to its instability, should coordinate to organize, operate, and pay for world food security. Variation in output, exports, and imports by a short list of countries accounts for 95 percent of the year-to-year changes in world grain trade. Instead of the approximately 75 countries involved in the failed 1978-79 wheat negotiations this list would include the United States, Canada, the EC, Australia and Argentina as exporters and Japan, the U.S.S.R., Mexico, Brazil, the EC, China, the Eastern Bloc countries and at most one or two others as importers.

This world food security system should break with international tradition of establishing an elaborate set of rules and automatic mechanisms for its operation. Rather it should operate on a consultative basis which allows and causes the major trading countries to act in the appropriate direction as needed. This solution places the burden for trade stabilization right where it belongs—on those countries that most use and benefit from trade.

An unconnected but related action requires the development of sufficient stockholding capacity in a large number of developing countries that can be managed solely on criteria relating to their own needs and conditions. This, and not a world scheme, will address the day-to-day problems of East Africa, Bangladesh and other similar areas.

This route to achieving a workable solution to one of the major North-South issues can only be attained by stepping outside of the traditional international frameworks and negotiating procedures. Unfortunately many countries will likely continue to prefer an unwork-

able scheme in which they play a part rather than a workable scheme that does not require their participation. As long as this is true there will be no progress toward world food security.

We also have some emerging policy issues here at home. If I am correct in my assertions that protectionism, market adjustment and market stabilization are major trade issues for the United States during the 1980's, several policy questions become evident. There will be a continuing need in the United States for a market stability mechanism like the farmer reserve. The changes which are occurring are complex and the policy responses and their full range of consequences have not been completely thought out. The answers are not simple. Among the proposed solutions which we must deal with are grain boards, bilateral agreements, and dual or multipricing schemes. It may become necessary that the United States adopt better ways to insulate its domestic market from the sharp and unexpected ups and downs in food prices, brought on by sudden shortfalls in importing countries. This is especially critical in those years when our exportable surplus for any particular commodity is less than normal or when export demand is greater than normal. One such scheme that has been suggested is a dual price system—one for domestic sales and another for the export markets. There will be a tendency for countries to become more protectionistic as they try to adjust either on the supply or demand side or structurally to changing prices, volumes, and other market-related factors. It will take fairly innovative policy formulations to satisfy U.S. domestic objectives without succumbing to greater protectionism.

RELATIONSHIP BETWEEN TRADE AND DEVELOPMENT

Another important linkage that we have tended to overlook in the past is the relationship between trade and development, particularly in the Third World. We only need to look at the economic development success stories around the world to realize that for the most part these are also our market development success stories for agricultural products. Major cases in point include Korea, Taiwan, and Mexico. Among the oil-producing countries we need to distinguish between the Arab countries and others. The Arab oil producers have amassed large foreign exchange reserves. While their agricultural imports have increased quite sharply, future increases in their agricultural trade may be limited because these countries contain relatively few mouths to feed. For example, the Arab world is currently using less than 10 percent of its oil revenues for food imports; Saudi Arabia only about 4 percent. On the other hand, there are several oil-producing countries such as Nigeria, Indonesia, and Mexico that have large and rapidly increasing populations and that have already shown a high propensity to import agricultural commodities in relation to their oil-produced foreign exchange reserves. In this latter group, Nigeria is currently spending about 14 percent of its oil revenues on food imports, while Indonesia and Mexico spend about one-third. But what of the non-oil-producing lower income Third World, those countries with a food need but without the foreign exchange to transform that need into effective demand?

Most of our foreign agricultural aid has been supported by two major interest groups. In the past quarter century farm groups supported Public Law 480 export programs to assist with periodic commodity surpluses in the domestic market. In addition, we have had the support of humanitarian interests to alleviate world hunger. In recent years, and even more so in the decade ahead, there has been less problem with agricultural surpluses. Increased foreign demand and tighter supply situations in much of the world have lessened the need for Public Law 480 title I shipments to offset excess domestic supplies. As commodity prices rise, inflating food costs, there is an increased opportunity cost in continuing foreign agricultural aid at previous volume levels. Thus, we see a stagnation in this form of surplus disposal program. The world hunger support for food aid programs has always been at a lower level than that of the food disposal interests. The realities are that with continuing concern over our national budgetary expenditures, there probably will not be much of a real increase in U.S. food aid. It is a very difficult policy decision as to what is our bottom line on food aid programs. In much of the developing world we see large segments of bilateral technical assistance aid and huge investments in agricultural projects by the international banks. Despite all of this activity, indigenous per capita food availabilities have not improved markedly and in some cases have even declined. Comparing the indexes for per capita food production for the developing countries between 1970 and 1979, we note that the index for the group increased very slightly in 1979 over that in 1970. Notably for the African countries (except South Africa), the index dropped from 99 in 1970 to 88 in 1979 (1961-65=100).

In 1970, the United States provided about 11 million tons of raw agricultural products of food aid at a cost of \$1.068 billion. By 1979 we were providing 8.1 million tons at a cost of \$1.486 billion. In effect, we supplied 26 percent less in volume but with an increased cost of 40 percent. Thus, food aid from the United States has been declining significantly—mainly because of budgetary considerations. At the same time, aid from other developed countries has not increased sufficiently to offset the decline in U.S. shipments. A policy issue of some likely importance during the 1980's will be the allocation of our export availability between aid and commercial sales—between our humanitarian instincts and our profit motive. What decision rules will we use, what criteria will be used in our decisions?

CONCLUSION

In conclusion I would stress that our agricultural export policy in the 1980's will remain one that is oriented to market expansion. Exports will continue to account for a very important segment of total sales of U.S. farm products—thus providing a major source of farm income and a very significant positive contribution to the U.S. balance of trade.

Exports will represent an increasing role in commodity markets during the next decade. For many years, the U.S. has assumed a residual role in international commodity markets—that is, we have been counted on to supply that which was left after other exporting coun-

tries made inroads—often at reduced prices to undercut our sales. However, perhaps within the next decade as increased world population and improved income levels of developing countries place greater demands on available food supplies, the U.S. "residual" will become even more important. An ESS study in progress suggests that this "residual" role may become so sensitive that, in effect, the U.S. control of that residual may have a much greater influence on world commodity price levels than we have today in 1980.

I would remind you that the bulk of the world's population increase is and will continue to be in the developing countries and centrally planned economies. Thus, the points I have discussed today with respect to these two very important trading blocs will be even more relevant in the decade ahead.

I would point out while our current trading system and our past performance in export sales have been very beneficial to our farmers and to the overall U.S. balance of trade, there are major challenges, sharp adjustment and difficult decisions which await us in the 1980's.

How well will we adjust? The agricultural sector has long shown it has had the capacity and ability to respond to new challenging economic circumstances. It is my hope that the Government can rise to the tasks of the changing and trying policy negotiations to obtain feasible solutions to the trade and development problems facing us in the years ahead. These attempts to make adjustments will require the involvement, tenacity and political will of a broad group of leaders in each nation concerned. In food and agricultural issues, we in the United States must continue to demonstrate leadership as we adapt and adjust to meet new world conditions.

COMMODITY OUTLOOK

OUTLOOK FOR FEED GRAINS

(By James P. Rudbeck, Foreign Agricultural Service, and Paul J. Meyers, World Food and Agricultural Outlook and Situation Board, U.S. Department of Agriculture)

OUTLOOK IN BRIEF

The world feed grain situation and outlook for 1980-81 is once again dominated by conditions in the United States and Soviet Union, and a tighter situation is reflected in prices well above year earlier levels. Combined production of the two countries, which accounts for slightly over two-fifths of the world total, is off 13 percent from the average of the past 2 years. Feed use for the two, which accounts for nearly half the world's total, could be off 5 percent from the 2-year average. Underlying these developments, however, are indications of firm demand elsewhere in the world, that in the short-run is relatively inelastic to higher world prices. Current prospects also point to little overall change in the export availabilities of foreign exporting countries. The result is that U.S. exports will provide the expected expansion in world feed grain trade and U.S. stocks will be drawn down sharply. Since coarse grain stocks or reserves are not large in other countries, world stocks as a percent of utilization are likely to drop to a level near the tight 1973-76 period.

Reduced stocks, particularly in the United States, means that the world no longer has the cushion that was built over the past 5 years. As a result, coarse grain availabilities in the coming year will be dependent upon next year's crop outturns. With the United States now supplying over 70 percent of world coarse grain exports, and trade providing about 14 percent of global utilization, crop developments in the United States and important importing or exporting areas will be critical to the 1981-82 outlook. If worldwide weather conditions are generally favorable resulting in bumper United States and world crops, stocks might be rebuilt some. However, significant production shortfalls again in important importing or exporting countries would result in major adjustments in livestock feeding, both here and abroad.

WORLD SITUATION IN 1980/81

The Setting.—Coarse grains or feed grains account for nearly half of the world's annual output of grain, including rice.¹ Within the United States, about 85 percent of domestic use is for livestock feeding while in foreign countries the proportion is somewhat lower, around 55

¹ The terms feed grains and coarse grains are used interchangeably in this report. For the United States, feed grains or coarse grains include corn, sorghum, barley, oats, and rye. For foreign countries, these same grains are included plus millet and mixed grains. Corn production accounts for about half of worldwide coarse grains production, barley about a quarter, sorghum one-tenth, and oats, rye, and mixed grains, the balance.

percent. However, it is livestock feeding and the desire by people around the world to upgrade their diets that has been the motor driving up world trade in feed grains. For example, while world wheat trade grew by an annual rate of about 8 percent in the 1970's, feed grain trade expanded at an annual rate of 12 percent. During the decade, U.S. wheat exports doubled from 20 to nearly 40 million tons and the U.S. share of world trade expanded from 36 to 44 percent; but for feed grains, U.S. exports have nearly quadrupled from 19 to over 70 million tons and the U.S. share of world trade went from 41 to 72 percent. One reason for the U.S. dominance in the world feed grain picture is our ability to produce and efficiently transport corn. Corn, which only makes up about half of the world coarse grain production, accounts for about 80 percent of world coarse grain trade and the United States provides roughly 80 percent of these trade flows.

WORLD COARSE GRAIN SUMMARY

[In millions of metric tons]

	1972-73— 1974-75 average	1975-76— 1977-78 average	1978-79	1979-80 preliminary	1980-81 forecast
World:					
Production	635	684	747	727	705
Utilization	644	674	742	729	739
Ending stocks	63	72	89	87	54
Stocks/utilization (percent)	(10)	(11)	(12)	(12)	(7)
Trade	65	81	90	100	103
United States:					
Production	173	194	218	235	193
Utilization	145	134	153	157	150
Exports (October/September)	39	52	60	71	74
Ending stocks	23	30	46	52	21
U.S. stocks/total (percent)	(37)	(42)	(52)	(60)	(39)
Soviet Union:					
Production	91	91	105	80	85
Utilization	95	103	113	101	102
Imports	5	11	10	19	17
Exports	1	1	1	—	—
Stocks change	—	—2	+1	—2	—
Rest of world:					
Production	371	399	424	412	427
Utilization	404	437	476	471	478
Imports	60	70	80	81	86
Exports	26	30	32	29	29
Net imports	34	40	48	52	57

DEMAND TO OUTSTRIP PRODUCTION

Largely as a result of reduced crops here in the United States and another poor crop in the Soviet Union, 1980-81 world production is estimated at 705 million metric tons, down 3 percent from a year ago and off 5½ percent from the record of 2 years ago. Reduced harvests are also being reported for Eastern Europe while increases are indicated in Canada, Mexico, Western Europe, and India in the Northern Hemisphere.

The Northern Hemisphere coarse grain harvests are virtually complete, but a large degree of uncertainty still surrounds the Southern Hemisphere crops which account for about one-tenth of the world total. If weather conditions continue favorable, increases are likely in Argentina and Brazil where area has been expanded. However, South Africa's production could fall from last season's bumper outturn while drought has reduced barley crop prospects in Australia.

At the global level, 1980-81 coarse grain utilization is forecast at 739 million tons, up 1½ percent from a year earlier but only about equal to 2 years ago. This indicated increase, however, follows a decline in 1979-80 resulting from a sharp dropoff in the U.S.S.R., reduced coarse grain availabilities in areas such as India, East Europe, Mexico, and Brazil and little or no expansion in the countries of Western Europe. For 1980-81, U.S. domestic utilization is expected to be off about 4½ percent and Soviet coarse grain utilization might be about the same as the reduced level of a year earlier. Elsewhere in the world, however, improved crops in some areas and stronger demand for both human consumption and livestock feeding is expected to boost coarse grain utilization levels enough to offset the declines in the United States and the U.S.S.R. In many areas, because of import levies or duties, compensation funds, subsidies, or strong currencies, prices paid by users in the short run are relatively unaffected by changes in world prices. Also, many of the more dynamic import markets for coarse grains are not significant producers of grains or other feedstuffs, and they must continue to rely on imports.

Following a year in which world production just matched utilization despite a record U.S. feed grain crop, lower U.S. production this year and a modest recovery elsewhere in the face of generally firm demand means global utilization may exceed production by as much as 33 million tons resulting in a sharp drawdown in stocks. This will be the first significant stocks reduction since 1974-75, and although physical volume may exceed the low levels of the tight 1973-76 period, because of an expanded utilization base, the ratio of stocks to utilization could be as low as during that period of time. However, the portion of those stocks held by the United States will be higher—projected at 39 percent versus a low of 28 percent in 1974-75.

WORLD TRADE AND U.S. EXPORTS NEW RECORDS

Current estimates point to a still higher level of world coarse grain trade in 1980-81 and a further expansion in U.S. exports to a new record. World trade in coarse grains for 1980-81 is forecast at 103 million tons or just slightly more than the 100 million of 1979-80. World trade has been expanding at around 5½ million tons per year, but last season's sharp gain almost entirely reflected larger U.S.S.R. imports; increased imports by such areas as East Europe and Mexico were offset by lower imports by areas such as West Europe, China, South Korea, Taiwan, and Iran.

Although Soviet production is not expected to be much improved this year over last, that country's access to foreign coarse grain supplies is expected to be limited relative to potential needs by the partial sales suspension applied by the major cooperating exporters, tightened world supplies, especially of non-U.S. feed grains, and the constraints of the Soviets own grain unloading and handling facilities. Soviet imports are forecast at 16½ million tons versus 19 million last year and 10 million 2 years ago. Low production for the second consecutive year and limits on imports will hold utilization about unchanged for 2 years, below the level of 2 years ago and not much different from the 1975-76—1977-78 average. There are indications that

the Soviets are seeking alternative feedstuffs such as tapioca, soybean meal, and prepared feeds.

In Western Europe, which accounts for about 20 to 30 percent of world coarse grain imports, it appears that pork production may be entering a moderate upswing phase. This, coupled with the prospects of more poultry production, indicates that demand for feed should be increasing. However, larger supplies of tapioca and other nongrain feed ingredients on the world market may temper any increase in feed grain usage and import demand for coarse grains. Some increase for corn might be possible because of a reduced European corn crop.

In Eastern Europe, not only is coarse grain production off, especially in the usual southern exporters, but potato crops—a major source of feed—are also off as much as 20-30 percent in some countries. This region will attempt to import as much coarse grain as its physical and financial capabilities will permit, but these two factors might limit the total to around last season's 11 million ton level.

In Japan, where feed grain imports were nearly 19 million tons last year, there appears to be some improvement in hog feeding margins and possibly less pressure to subsidize rice into feeding rations due to a sharp reduction in rice production. This suggests that imports could pick up in 1980-81.

The pork industries of Taiwan and South Korea last year faced some of the same problems as Japan, and imports by both fell off after showing many years of steady growth. In both countries, there are signs that the pork industries have turned around; imports in 1980-81 are expected to recover and may approach the volumes of 2 years ago—about 6 million tons in total.

China, which emerged as a significant corn importer 2 years ago, switched emphasis to wheat this past year, although still importing close to 2 million tons of corn. The recently signed bilateral agreement with the United States, which calls for 15-20 percent of the annual purchases of 6-9 millions tons of U.S. grain to be corn, should ensure at least the same volume of corn imports in 1980-81. China has also purchased corn from Thailand.

Mexico sharply expanded its imports of coarse grains this past year to about 5 million tons versus 3 million a year earlier in part to offset crop losses and to meet rising human consumption needs, but also to meet expanding poultry and pork feeding requirements. Grain production is expected to be higher this year, but imports will still expand to meet burgeoning food and feed demand. Brazil, historically a corn exporter, has had to resort to imports since 1977-78 because of disappointing crop outturns and expanding poultry feed requirements and will be maintaining imports until the availability of the next corn crop in 1981. Feed grain imports by countries such as Egypt, Saudi Arabia, Nigeria, and Peru are all expected to rise in the current year.

In total, world feed grain trade is forecast to increase about 3 million tons to 103 million in 1980-81. Current indications are that the total level of shipments by other exporters may be no larger than during this past year. This implies that on a July-June basis, U.S. exports will again provide all of the increase and that the U.S. share of world trade could increase just slightly to 72 percent versus 64 percent 2 years ago.

Both Canadian and Australian exports (mostly barley) are expected to fall as both countries, having depleted stocks this past year, must rely on current production for exports. Although Canadian production is higher than last year, farmers may deliver less grain because of increased farm requirements resulting from last summer's drought. The Australian barley crop was also struck by drought although sorghum production in early 1981 may be up. Barley shipments by the EC will be expanded from continued large harvests. Corn movements out of the surplus producing countries of East Europe could be cut sharply. Exports by Argentina and South Africa will hinge on the outcome of the corn and sorghum crops that are just now being planted. Early indications are that plantings will be expanded in Argentina which should mean larger exports if no adverse weather conditions hit as this past year. However, the bulk of any sharply larger shipments would mostly be reflected after June 30. The corn area in South Africa is fairly constant from year to year and the crop outturn depends upon timely rains. At this early date, only an average crop can be assumed versus last season's bumper outturn. Nonetheless, this should mean larger July-June exports than recorded in 1979-80. Little change is expected in either Thailand's level of corn production or exports.

SUMMARY AND SHORT-TERM OUTLOOK

In summary, the current world coarse grains outlook is for utilization to exceed production, for stocks to be drawn down to levels comparable to the early to midseventies, for prices to be above year ago levels and for world trade and U.S. exports to expand. Factors over the next several months that could alter this outlook and price development include: Southern Hemisphere crop outturns; any unusual or sudden change in import requirements from those currently expected; and any early indication of next season's supply and demand outlook, planting intentions, and winter crop progress in Western Hemisphere areas. Bumper crops in the Southern Hemisphere exporting countries or any lessening in demand because of changes in demand for livestock products or feeding rates could result in somewhat lower world trade and U.S. exports than currently forecast. On the other hand, crop shortfalls in the Southern Hemisphere, indications of poor winter crop progress in the Northern Hemisphere, or larger imports than now expected by important importing areas would put additional pressures on U.S. supplies and U.S. and world prices.

PRELIMINARY OUTLOOK FOR 1981/82

It is extremely early to be looking out to 1981-82, but there are several points that can be made based on current indications:

With reduced stocks, particularly in the United States, coarse grain availabilities will be dependent more upon next season's crop outturn than in recent years;

The U.S. crop will be critical since we are the largest producers and consumers, provide over 70 percent of world exports, and have held the bulk of the world's stocks;

World utilization and import demand should remain strong due to increasing population, rising incomes, and desires for livestock and poultry products, and consequently feed use;

There is a strong underlying demand for feed grains in a number of "middle income" and developing countries that must be met by imports;

Soviet and East European imports will remain large even if crops rebound, in order to rebuild stocks;

There has been virtually no growth in overall feed grain exports by other countries and the United States has provided nearly all of the expansion in world trade. No evidence or developments suggest that this will change;

A turn in worldwide economic conditions or reactions to prices much higher than currently indicated could temper demand and trade flows.

U.S. OUTLOOK

FEED GRAINS

Smaller crop reduces feed grain supplies

Severe drought this summer over most of the major producing areas sharply reduced the U.S. feed grain crop. As of November 1, feed grain production is forecast at 192 million tons, 18 percent below last year's record harvest and the smallest crop since 1976. Although planted acreage in 1980 increased about 3 percent from 1979, the hot, dry weather resulted in more acreage being abandoned. Thus, harvested acreage is off nearly 2 percent from last year.

The major impact of the drought has been reflected in significant yield reductions. The feed grain yield of 1.93 metric tons per acre is down 16 percent from last year's record. The yield for each feed grain was below 1979, with corn and sorghum showing the greatest decline.

Large carry-in stocks of feed grains are partially offsetting the much smaller crop. Carry-in stocks of 52 million tons were the largest since 1964. Combining the carry-in stocks with a production of 192 million tons gives a total 1980-81 feed grain supply of 244 million tons, 13 percent below 1979-80.

Utilization to remain high

Despite reduced supplies and higher prices, total utilization of feed grains in 1980-81 is expected to remain near the record 1979-80 level of 228 million tons. Larger exports and increased use of grain for sweeteners and ethanol production will help to partially offset a sharp reduction in feed use. For the year, feed grain use will likely total around 224 million tons, 2 percent below 1979-80.

World demand for feed grains will continue to grow in 1980-81. Increased pork and poultry numbers in a number of countries, combined with a smaller than expected increase in foreign production, will boost the need for imported grain. Since the United States is by far the largest exporter of feed grains, the export picture is bright for the 1980-81 season. U.S. feed grain exports are expected to total a record 74 million tons, 3 million above the 1979-80 level, and the sixth consecutive year-to-year increase. The U.S. share of total world trade in 1980-81 is projected at 72 percent, the same as in 1979-80, but well above the 62 percent average from 1976-77 to 1978-79.

An expected sharp cutback in feed use will likely reduce total domestic use of feed grains to the lowest level in 3 years. Feeding

margins for U.S. pork and poultry producers have been squeezed this past year by large meat supplies and lower prices. While prices of livestock and poultry will increase, tighter grain supplies and higher grain prices will likely keep pressure on margins this year. So, prospects are for a significant decline in pork production and a slowing in the rate of increase in broiler production. Milk production may be up only 1 to 2 percent for the feed year after a gain of about 3½ percent in 1979-80. The number of cattle on feed will likely be up slightly from the low levels of 1979-80. For 1980-81, feed use of feed grains is projected at 126 million tons, 7 percent below 1979-80, and the first decline in feed use since 1976-77.

Food, seed, and industrial use will likely increase by over 2 million tons as more corn is used in production of sweeteners and ethanol. Total domestic use of feed grains is projected at 150 million tons, down about 4 percent from 1979-80.

Feed grain stocks to fall

With feed grain production well below a year ago, and utilization expected to remain strong, carryover stocks of feed grains will drop to their lowest level in 5 years. Total utilization is expected to exceed production by 31 million tons, causing stocks to decline from 52 to 21 million tons. This would be the largest ever year-to-year decline in stocks. For 1980-81, carryover stocks would represent about 9 percent of utilization, compared with 23 percent in 1979-80, and 9 percent during the tight supply period of 1974-76.

The tighter supplies and sharply higher prices expected this year will also have a substantial impact on the amount of feed grains in reserves. Coming into the 1980-81 year, about 25 million tons of feed grains were in reserve with about 18 million tons farmer owned and the remainder in Government inventory. Four million tons of the Government-held stocks were acquired this past spring in actions taken to offset the impact of the Soviet grain embargo. By the end of this marketing year, it is expected that the reserve—both farmer and Government owned—will be nearly depleted.

Record feed grain prices expected

As crop prospects in the United States deteriorated this past summer, feed grain prices moved sharply above last year's level, and reached their highest level since 1974. The farm price of corn increased about a fourth from April to October 1980 with comparable increases for the other feed grains. For 1980-81, the farm price of corn and sorghum will likely be up around 40 percent from 1979-80 with smaller increases expected for barley and oats. The forecast price range for corn of \$3.35 to \$3.75 per bushel for the 1980 crop compares with the previous record of \$3.03 for the 1974 crop.

CORN

Corn production down sharply

U.S. corn production in 1980, based on conditions as of November 1, is forecast at 6.46 billion bushels, down 17 percent from 1979's record crop, and 9 percent below the 1978 harvest. The projected corn yield of 90.8 bushels per acre is off nearly 19 bushels from last year's record,

while harvested acreage will be virtually the same as in 1979 despite a 3 1/2 million acre increase in planted acreage.

Spring planting conditions this year were very good with the corn crop being planted earlier than normal. Prospects in early July pointed to another corn crop in excess of 7 billion bushels. However, July and August were very hot with little precipitation over a significant portion of the major corn producing areas. Corn crop prospects continued to deteriorate each month, with the current forecast 1.3 billion bushels below last year's harvest.

Virtually all of the major producing States have experienced large yield reductions this year compared with 1979. The corn yield in Illinois is expected to be down 34 bushels per acre this year while the yields in Indiana, Iowa, and Nebraska are projected down 16, 17, and 29 bushels respectively. Only the States of Ohio, Michigan, and Wisconsin will have yields at or about 1979 levels.

Total corn supplies for 1980-81 will be down considerably from 1979-80. Large carrying stocks of 1.6 billion bushels—the largest since 1964—will help to cushion the effect of the smaller crop. However, projected 1980-81 supplies of 8.06 billion bushels will still be down 11 percent from 1979-80, and 2 percent from 1978-79.

Use to Expand

An expected increase in exports this year, reflecting continued strong world demand, will more than offset lower feed use and push total utilization of corn in 1980-81 to a record 7.5 billion bushels. This level of use would be up slightly from 1979-80 and nearly a tenth above 1978-79.

Corn exports in 1980-81 are projected at a record 2.6 billion bushels, over 150 million above last year's level. World import demand for grain continues to grow as population increases and countries attempt to increase production of meat, milk, and eggs. With large available supplies, the United States will continue to benefit from this increased demand for grain. Corn exports are expected to increase for the sixth straight year with larger amounts expected to be shipped to Western Europe, Japan, Korea, and Taiwan.

The tighter grain supplies and higher prices for corn this year will have a dampening effect on the amount of corn fed to livestock and poultry. Feeding margins of pork producers were negative early this year, causing a cutback in farrowing this past summer and fall. This cutback will likely continue through the entire feeding year, with pork production expected to be off nearly a tenth in 1980-81. Broiler producers' returns were also squeezed earlier this year but have since improved. Production during the 1980-81 feed year may show only a slight increase from a year earlier. Over the past 3 years, broiler production has increased from 3 to 10 percent a year. Milk production may also show only a modest increase from 1979-80. Placements of cattle on feed may pick up during the latter part of the feed year as feeding margins improve. The total amount of corn used for feed in 1980-81 is projected at 4.2 billion bushels, down 5 percent from last year. Some corn may be substituted for other feed grains in feeding rations because of sharply reduced supplies of these other grains.

The amount of corn used for sweeteners and ethanol production will continue to increase in 1980-81, perhaps by 75 million bushels or more.

Total domestic use of corn in 1980-81 is likely to fall about 100 million bushels below the 5 billion used in 1979-80.

Billion Bushel Reduction Likely in Corn Stocks

The strong domestic and export demand for corn coupled with a drastic reduction in production points to a billion bushel decline in stocks this year. By the end of the 1980-81 marketing year, corn stocks are projected to fall to around 550 million bushels compared with 1.6 billion a year earlier. Corn stocks would represent about 7 percent of utilization compared with 21 percent in 1979-80, and 7 percent during the low stocks period of 1974-76.

Reserve stocks of corn will likely be depleted by the end of the marketing year. The farmer-owned reserve of corn reached about 900 million bushels by early summer as farmers were given additional incentives to place grain in reserve to offset the suspension of grain sales to the Soviet Union. As market prices rose to above the release price in July, this grain started coming back on the market. By October 1, the beginning of the 1980-81 marketing year, the corn reserve had been drawn down to 636 million bushels. Since that time, the movement of corn has slowed, partially because of the harvesting season, to where the reserve now totals about 585 million bushels. Of this total, about 50 million bushels have been called. Market prices are within about 15 cents of the higher call price of \$3.26 per bushel. When this call price is reached the corn remaining in reserve will be called and farmers will have 90 days to redeem their loans or forfeit the grain to the Commodity Credit Corporation (CCC). About 75 percent of the corn currently in reserve is in the States of Minnesota, Iowa, and Nebraska. By October 1, 1981, it is likely that all of the corn will have been removed from the farmer-owned reserve.

In addition to the farmer-owned reserve, there are about 255 million bushels of corn in Government inventory. About 155 million bushels of the total was purchased this past spring to offset the effects of the sales suspension. This corn cannot be sold by CCC unless the market price of corn reaches \$3.42 per bushel. Since prices are expected to exceed that level during the marketing year, and because stocks of corn will be extremely tight, it is likely that all of this corn will be sold out of Government inventory.

Corn Prices Move Higher

Farm prices of corn remained relatively stable at around \$2.40 per bushel from January to June 1980. Then, as crop prospects in the United States were reduced by the widespread drought, prices started to climb. By mid-October, farm prices reached \$3.03 per bushel, over 60 cents above a year ago, and \$1 above the 1978 level. Prices currently are averaging around \$3.10 per bushel and are expected to continue to increase at least through early summer of 1981. When the call price is reached, probably by the end of December, prices may flatten out for a short time, but then are expected to continue on an upward trend. Prospects for the 1981 crops, both in the United States and the rest of the world, will impact significantly on prices for the latter part of the crop year.

For the 1980-81 marketing year, the farm price of corn is expected to average from \$3.35 to \$3.75 per bushel compared with \$2.50 in

1979-80 and \$2.25 in 1978-79. Corn prices for the season will likely average well above the previous record of \$3.03 per bushel set in 1974-75. Prices for the other feed grains in 1980-81 will also average well above 1979-80 levels. Sorghum prices are projected at \$3.25 to \$3.60 per bushel versus \$2.25 for 1979-80; barley, \$2.60 to \$2.80 versus \$2.32; and oats, \$1.60 to \$1.80 versus \$1.36.

1981 U.S. FEED GRAIN PROGRAM

There will be no set-aside requirements for feed grain producers for the 1981 crops. This will be the second straight year of unrestricted production. Without a set-aside program, producers will be able to expand production to meet domestic and export requirements and rebuild stocks.

Feed grain producers must plant within their normal crop acreage (NCA) to be eligible for program benefits in 1981. The program benefits include target price protection, commodity loans, farmer-owned reserve, and disaster protection.

In order to qualify for full target price protection, farmers cannot plant more corn, sorghum, or barley in 1981 than was considered planted to these crops this year. Farmers who exceed this acreage will be subject to an allocation factor that can reduce any target price payment by up to 20 percent.

Other features of the program include:

A loan price of at least \$2.25 per bushel for corn, with other feed grain loans based upon a feed value relationship to corn. Minimum reserve release and call prices for corn will be \$2.81 and \$3.26 per bushel, respectively.

Target prices at least equal to 1980 levels of \$2.35 per bushel for corn, \$2.50 for sorghum, and \$2.55 for barley. Final target prices will be announced in the spring of 1981.

Preliminary national program acreages (NPA) of 90.1 million acres for corn, 15.4 million for sorghum, and 9.7 million for barley. The NPA is the number of acres needed to be planted to meet projected domestic and export requirements, as well as provide for an adequate carryover.

U.S. FEED GRAINS AND CORN¹

Commodity	1978-79	1979-80 estimated	Projected	1980-81 probable variability ²
Feed grains:				
Area (million acres):				
Planted	122.8	117.6	120.8	
Harvested	104.5	101.2	99.6	
Yield per harvested acre (metric tons)	2.08	2.31	1.93	
In million metric tons:				
Beginning stocks	41.2	45.9	51.9	
Production	217.4	233.9	192.3	+3 to -3.
Imports	3	3	3	
Supply, total	258.9	280.0	244.5	+3 to -3.
Feed and residual	133.1	135.9	126.5	+9 to -9.
Food, seed, and ind	19.7	20.9	23.2	+1 to -1.
Domestic, total	152.8	156.8	149.7	+9 to -9.
Exports	60.2	71.3	74.2	+6 to -6.
Use, total	213.0	228.1	223.9	+13 to -13.
Ending stocks	45.9	51.9	20.6	+7 to -4.

See footnotes at end of table.

U.S. FEED GRAINS AND CORN¹—Continued

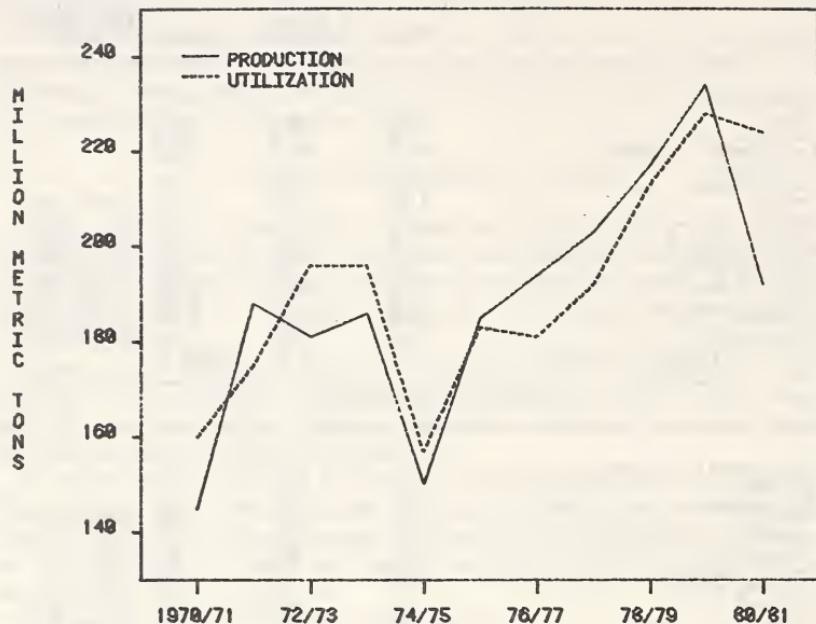
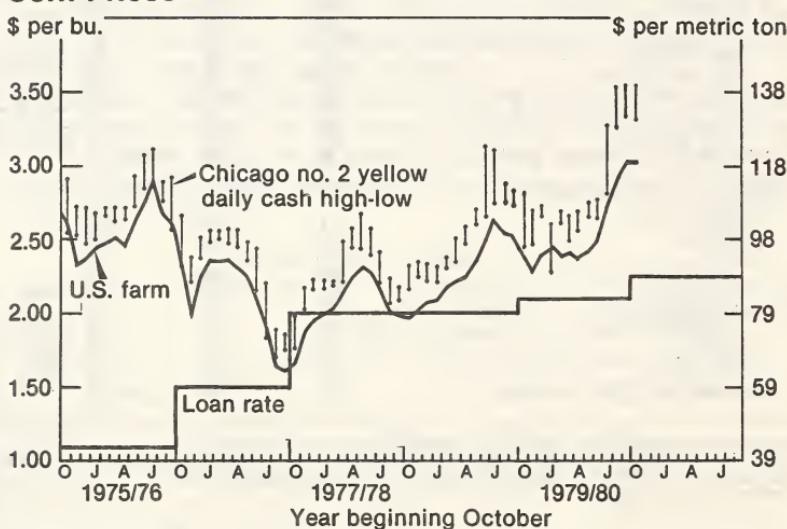
Commodity	1978-79	1979-80 estimated	Projected	1980-81 probable variability ²
Corn:				
Area (million acres):				
Planted	80.1	80.0	83.5	
Harvested	70.3	71.0	71.2	
Yield per harvested acre (bushels)	100.8	109.4	90.8	
In million bushels:				
Beginning stocks	1,104	1,286	1,597	
Production	7,087	7,764	6,461	+135 to -135.
Imports	1	1	1	
Supply, total	8,192	9,051	8,059	+135 to -135.
Feed and residual	4,198	4,396	4,200	+300 to -300.
Food, seed, and ind.	575	625	715	+25 to -25.
Domestic, total	4,773	5,021	4,915	+315 to -315.
Exports	2,133	2,433	2,600	+200 to -200.
Use, total	6,906	7,454	7,515	+450 to -450.
Ending stocks	1,286	1,597	544	+200 to -100.
Average farm price (dollars per bushel) ³	2.25	2.50	3.35-3.75	

U.S. SORGHUM, BARLEY AND OATS¹

Sorghum:				
Yield per harvested acre (bushels)	55.1	62.9	45.3	
In million bushels:				
Beginning stocks	191	159	146	
Production	748	814	551	+25 to -25.
Imports				
Supply, total	939	973	697	+25 to -25.
Feed and residual	566	495	365	+30 to -30.
Food, seed, and ind.	7	7	7	
Domestic, total	573	502	372	+30 to -30.
Exports	207	325	250	+25 to -25.
Use, total	780	827	622	+50 to -50.
Ending stocks	159	146	75	+15 to -15.
Average farm price (dollars per bushel) ³	2.02	2.35	3.25-3.60	
Barley:				
Yield per harvested acre (bushels)	48.6	50.6	47.7	
In million bushels:				
Beginning stocks	172	229	192	
Production	449	378	352	
Imports	10	12	10	
Supply, total	631	619	554	
Feed and residual	206	202	185	+25 to -25.
Food, seed, and ind.	170	170	172	
Domestic, total	376	372	357	+25 to -25.
Exports	26	55	75	+20 to -20.
Use, total	402	427	432	+40 to -40.
Ending stocks	229	192	122	+20 to -20.
Average farm price (dollars per bushel) ³	1.92	2.31	2.60-2.80	
Oats:				
Yield per harvested acre (bushels)	52.2	54.4	50.9	
In million bushels:				
Beginning stocks	311	287	240	
Production	596	534	451	
Imports	1	1	1	
Supply, total	908	822	692	
Feed and residual	530	498	450	+25 to -25.
Food, seed, and ind.	78	80	80	
Domestic, total	608	578	530	+25 to -25.
Exports	13	4	10	+5 to -5.
Use, total	621	582	540	+25 to -25.
Ending stocks	287	240	152	+20 to -20.
Average farm price (dollars per bushel) ³	1.20	1.36	1.60-1.80	

¹ Marketing year beginning Oct. 1 for corn and sorghum; June 1 for barley and oats.² The "probable variability" reflects the root mean square error and/or standard error of estimate from trend and judgment. Chances are about 2 out of 3 that the outcome will fall within the indicated ranges.³ Season average farm price.

U.S. FEED GRAIN PRODUCTION AND UTILIZATION

**Corn Prices**

DISCUSSION OF FEED GRAIN OUTLOOK

(By J. William Uhrig, Purdue University)

Good morning ladies and gentlemen. I consider it an honor to be asked to be a participant in the Agricultural Outlook Conference. A discussant has three choices: He can (1) discuss the original paper, assessing the degree of agreement, (2) present his own outlook using the same basic data, and/or (3) present additional information to help clarify the outlook. Since I did not receive the original paper until after press time. I have chosen the latter alternative.

In the time allotted, I would like to make four major points. These include: (1) communication, (2) world feed grain situation, (3) inflation impact and (4) price pattern and impact.

I. AN ANALYST MUST COMMUNICATE WITH HIS AUDIENCE (CLIENTS) IN TERMS THEY CAN UNDERSTAND

The USDA does an outstanding job of gathering basic data on crop production. I look forward to seeing the demand projections (with the periodic revisions). The presentation of the departmental consensus leaves a lot of room for misinterpretation. In addition, different people (groups) have different needs. Let me illustrate my point with a story.

I recently rekindled my interest in private aviation. One day while flying, I overheard the following conversation on the radio between a pilot and tower operator:

PILOT. What time is it?

TOWER RESPONDS. What Airline are you with?

PILOT [sounding indignant]. What difference does that make?

TOWER. It alters the way I respond to your question. If you are with Airline A, I would simply respond, "it's 2 o'clock." If you are with Airline B, I would use the military time designation and say, "It's 1400 hours." But if you are with Airline C, I would say, "The big hand is on 12 and the little hand is on 2." You can substitute your own code for the various airlines.

Likewise outlook needs to be targeted (adapted to its audience). The latest outlook projections indicate the 1980-81 demand to be 7,465 million bushels of corn, \pm 450 million bushels, and the U.S. average price to be \$3.30-\$3.75 per bushel.

A. The groups I work with won't let me get by using a 900 million bushel range on demand. A researcher with a quantitative background may recognize this as the root mean square error and/or standard error of estimate from trend and judgment. Recognizing that no one can predict precisely what the various segments of demand will turn out to be, I prefer point estimates of the most likely outcome, or some alternative estimates with stated probabilities of each occurrence.

B. The U.S. average price provides a benchmark, but there are many other considerations:

1. Average prices for Indiana are different than average prices for New Jersey or any other State. Prices in southern Indiana are often very different than prices in northern Indiana. Terminal market prices are considerably higher than prices received by farmers at country elevators. Country elevator prices can differ due to adequacy of transportation at various times of the year, and the ability to capitalize on multiple car freight rates.

2. Merchandisers are primarily interested in "the basis" rather than flat price.

3. Speculators and account executives are interested primarily in when price trends are going to change and when the market has peaked.

C. No probability of the accuracy of the price range is given. As of September 12, 1980, Agricultural Supply and Demand Estimates published the range as \$3-\$3.30 as the season average farm price, I recognize that several things have changed since September 12. But some of the farmers attending outlook meetings in early September may not be back at another meeting a month later to hear about the change. In my outlook meetings, I provided a rough guideline of the price impact of future changes, indicating that "each 100 million bushels change in production and/or consumption would make 15 cents difference in the season average farm price," and provided the dates for the next USDA reports.

D. Many (most) farmers have as their marketing objective to sell all of their grain at the top of the market. This leads to the obvious question, "If the average is going to be \$3.30-\$3.75, what is the peak price likely to be? The two prices can be significantly different. In 1974 when the average price was \$3.03, the average price for October was \$3.75.

II. UPDATE ON THE WORLD FEED GRAIN SITUATION

Recent situations which have altered the feed grain outlook include:

1. Reduction in the October 1 stocks estimate of over 100 million bushels.

2. Reduction in estimate of U.S.S.R.'s crop production to 181 million tons.

3. Four year grain agreement with China which calls for 6-8 million tons of grain, of which 15 to 20 percent can be corn and the rest wheat.

4. Revisions in world grain supply/demand reports which suggest the 1980-81 situation could be as tight as the 1974-75 situation—and this does not include the downward revisions in the Soviet crop.

Currently, the domestic cash markets appear bearish with a wide basis, some grain stored on the ground, and no apparent shortages. Yet, the futures markets recently made new highs—apparently performing their role of discounting future situations.

Many comparisons have been made between current conditions and the bull market of 1973-74. In 1973, all commodities rose sharply, as the economy adjusted to floating currencies, removal of price controls, a credit squeeze, and bullish fundamental. Now, high interest rates and recessionary conditions around the world present a much changed

economic and financial climate. While a bull market under current conditions may be more orderly, the strong world demand and the impact of inflation on prices may cause prices to surge higher than anticipated, based on previous conditions.

III. IMPACT OF INFLATION

Anyone with teenage children is constantly reminded of the impact of inflation. They make you realize the world has changed since you were a teenager in all discussions of allowances or contemplated purchases. We need to keep this fact in mind when discussing commodity prices. While I've never seen a definitive study on the rate of inflation and the increase in grain prices, I have observed that grain prices tend to exceed the rate of inflation in times of scarcity, and lag behind inflation as stocks accumulate. But due to increased production costs, the grain prices may not return to the previous low levels. When viewed in 1967 dollars, last year's average price of corn of \$2.50 per bushel was equivalent to 96 cents. We need to consider this fact when discussing how high prices may go under various supply-demand conditions.

The size of the carryover supply has an impact on prices. But the importance of the carryover supply changes with increased usage. In 1974-75, the ending stocks were 361 million bushels, 7.48 percent of total usage. The U.S. average price was a record \$3.03 per bushel. Current estimates of ending stocks on October 1, 1981, are 600 million bushels, 8 percent of usage estimates, about the same as the 1974-75 situation, with price estimates of \$3.30-\$3.75 per bushel. Apparently we are at a point on the demand curve that is very inelastic, and prices may have to rise quite sharply—if only for a short time—to ration supplies.

IV. PATTERN AND IMPACT OF PRICES

Since late June, the rise in corn prices was considered to be the result of a supply driven bull market. This type of market typically peaks early, leading to the old adage that, "A Short Crop Has a Long Tail." Since about mid-October, I believe the emphasis has changed to a demand driven bull market. The difference in terminology is significant. We are likely to see much more staying power in the new higher level of prices under the demand situation. I believe corn prices will remain high (at least by historic standards) until the 1981 crop is assured.

Total corn usage was maintained this year because we had huge levels of surplus stocks. Corn usage has grown to over 7.46 billion bushels. The normal expectation is to increase corn usage in 1981-82. But we have only produced over 7.5 billion bushels of corn one time in history—in 1978 when weather conditions were ideal for corn production. With carryover supplies down to 600 million bushels, any surge in demand, and/or problems with the 1981 corn crop will mean sharply higher corn prices. It also means that we can expect an increase in corn acreage in 1981 and that the price relationships between corn and soybeans must be in line with historic relationships for this to be accomplished.

In analyzing corn demand, we normally look at three major categories: Feed, seed and industrial use, and exports. Of the three, feed

usage is the most sensitive to price increases. To illustrate this point, on October 28, 1980, U.S. No. 3 Yellow corn was selling for \$4.25 in Rotterdam, the Netherlands. The EC import levy on corn was \$2.53 per bushel. U.S. corn prices could go sharply higher before we would curtail the export market in the EEC. Prices are fixed by governments in other importing nations and price increases do not have the same impact on their consumption as it does to ours.

Corn usage for alcohol is subsidized, and other industrial users can pass along price increases, given an adjustment period. Price increases have predictable impacts, both short term and long term for livestock producers. With the price increase in 1974-75, feed usage was decreased 25 percent or 1 billion bushels. Decreases in livestock production means higher meat prices, increases in the CPI, and in turn increases in wages for contracts tied to the CPI. Thus, the price of corn is important in the efforts to bring inflation under control.

SUMMARY

I basically agree with the short term outlook presented. However, I believe there is a potential for prices sharply higher than the averages to exist for a short period of time. With inflation, a cash price of \$3.75 doesn't mean the same thing it did in October 1974. With the higher prices and interest rates, the "carrying costs" of storage have increased. Six month's storage can add 50 cents to the break even price as compared to selling at harvest.

The impact of the improved prices is not equally shared by farmers. The sharply higher prices have resulted partially from yield reductions over a wide area of the Corn Belt. Production costs have soared, and as a result many farmers still find themselves financially pinched.

In closing, I would encourage farmers to begin pricing part of their 1981 production—even before it's planted.

My final comment concerns the longer range supply-demand and price prospects. Current agricultural legislation covers the 1981 production. A major task for the new administration will be to draft the Agricultural Act of 1981. Over the next decade, I expect exports to continue to increase. For much of the period, we may be more concerned with scarcity than surpluses. In this environment, particular attention needs to be given to livestock feed needs and methods of preventing occasional surpluses from depressing prices below the cost of production.

OUTLOOK FOR FRUIT AND TREE NUTS

(By Ben W. Huang, Agricultural Economist, Economics and Statistics Service, U.S. Department of Agriculture)

The fruit industry in the 1980-81 season expects to repeat the preceding season's pattern with ample supplies. Production of both citrus and noncitrus fruits is expected to set records. Record production for apples, grapes, and oranges and increase in supplies of pears and lemons will result in lower grower prices for most fruits but still a moderate increase in retail prices. Higher contract prices and good demand should hold up noncitrus grower returns, but another record citrus crop in prospect may weaken grower prices. Overall, with increased supplies but slightly lower prices, grower returns should increase moderately and the fruit industry will have another profitable year. Higher input costs, particularly for labor and energy, however, may reduce profits below those of 1979-80.

Even with larger supplies, consumers are still likely to pay higher prices for fruits and nuts because of the rising cost of marketing. Costs of marketing have increased steadily almost in every category this year. Labor cost for food retailing has increased almost 11 percent from a year ago. Transportation rate, a major component of fresh fruit marketing cost, have also increased sharply, up 19 percent from a year earlier. Including all other items, the index of food marketing cost advanced to 289.9 (1967=100) in September 1980 from 257.7 a year earlier, or an increase of 12.5 percent. However, the large fruit and nut supplies will moderate the increase in retail prices of many items. Thus, relative to the retail prices of other foods, fruit will still be a good buy. In addition, there will be occasional special promotions for many processed items, particularly canned fruit and citrus juice, in supermarkets because supplies are expected to be more than ample.

GENERAL PRICE OUTLOOK

Because of the record citrus crop, the index of prices received by growers for fresh and processing fruit have averaged 14 percent lower during the first 10 months of 1980 than a year earlier. Reflecting smaller shipments of new crops of grapefruit and oranges, the October index advanced to 223 (1967=100) from 212 in September, but still 3.4 percent below a year ago. But, with larger supplies of apples and pears, in addition to a record citrus crop in prospect, grower prices are expected to decline during the fourth quarter from the current levels and average approximately 14 percent lower in 1980 than in 1979. Prices are expected to remain moderately lower in the first half of 1981 than a year earlier.

Marking the first decline this year, the BLS September consumer price index (CPI-U) for fresh fruit (unadjusted) declined to 286.3

(1967 = 100) from 302.3 in August. The September index was still 5.5 percent above a year ago. With the seasonal increase in supplies of fresh fruit, particularly apples and oranges, retail prices are expected to continue to decline in the fourth quarter. However, the continued increase in costs of distribution and marketing will keep retail prices for fresh fruit this fall and winter above a year earlier. For the year 1980, the retail price index for fresh fruit is likely to average approximately 6 percent above 1979. This rate of increase is more moderate than in recent years. Retail prices will average higher in the first half of 1981 than a year ago.

TABLE 1.—INDEX OF QUARTERLY PRICES RECEIVED BY GROWERS FOR FRESH AND PROCESSING FRUIT
[1967 = 100]

Year	1st	2d	3d	4th	Annual average
1976.....	126	126	130	135	129
1977.....	143	151	159	200	163
1978.....	189	220	260	225	224
1979.....	226	244	258	233	240
1980.....	200	216	206	1 200	1 206

¹ Estimated.

Source: Agricultural prices, CRB, ESS.

TABLE 2.—QUARTERLY CONSUMER PRICE INDEXES FOR FRESH FRUIT
[1967 = 100]

Year	1st	2d	3d	4th	Annual average
1976.....	146	161	170	166	161
1977.....	172	190	193	185	185
1978 ¹	194	222	247	221	221
1979.....	218	251	279	246	248
1980.....	238	265	290	2 255	2 262

¹ From 1976 to June 1978, these indexes were entitled "Urban Wage Earners and Clerical Workers," BLS discounted these indexes as of June 1978. Starting with January 1978 new index entitled "All Urban Consumers," replaces previous index.

² Estimated.

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Fresh citrus fruit

The first forecast of the 1980-81 citrus crop (except grapefruit in California, other than desert valley) indicates a record 16.5 million tons, slightly above the preceding season's record crop. Dominating the citrus scene is the prospect of another record orange crop, primarily because of the record crop from California. With the exception of lime production, slightly smaller crops are currently expected for all citrus in Florida, which will still account for almost 80 percent of total citrus production in 1980-81.

Oranges.—October 1 prospects point to a record orange crop of 276 million boxes, 1 percent more than last season's crop and 31 percent larger than the 1978-79 harvest. The larger output is mostly due to a record California crop. The forecast for Florida orange production is set at 203 million boxes, 2 percent below last season's record crop, but

still 24 percent above the 1978-79 season. Most of the decrease was caused by the lack of rain during the summer; the drought made most new growth start hardening off. In addition, the bearing acreage of all oranges in Florida as of January 1, 1980 was slightly below the level of 2 years ago. At 65 million boxes, the California crop is up 9 percent over last year. The navel crop is placed at 38 million boxes, 17 percent more than last year's record, while the Valencia forecast, at 27 million boxes, is the same as last year. The Texas crop, recovering after last year's freeze, is expected to be 5.6 million boxes, 93 percent above 1979-80, but still 12 percent below 1978-79. Arizona producers expect to harvest 2.8 million boxes, 20 percent less than last season.

TABLE 3.—U.S. CITRUS FRUIT PRODUCTION: 1978-79, 1979-80, AND INDICATED 1980-81

[1,000 short tons]

Crop	1978-79	1979-80	1980-81
Oranges.....	9,160	11,839	11,916
Grapefruit ¹	2,661	2,875	2,828
Lemons.....	745	789	984
Limes.....	29	44	48
Tangelos.....	189	288	234
Tangerines.....	237	275	273
Templets.....	212	270	257
Total ¹	13,233	16,380	16,540

¹ Excludes California grapefruit in "other areas."

Fresh orange prices at both farm and retail levels so far have been substantially below year earlier levels. The record crop prospects for 1980-81, combined with expected larger carryover stocks of most processed items, especially frozen concentrated orange juice, will cause orange prices to remain weak. Prices of fresh oranges will be lower than last year, barring a major freeze, in view of substantially larger supplies of California navel oranges and a record apple crop. Current orange market prospects through the winter point to grower prices remaining below year-earlier levels. Retail prices will also remain lower.

Reflecting larger supplies and lower prices, export demand for fresh oranges has been strong. With record orange production in the United States in prospect now, U.S. exports during 1980-81 could surpass the 1979-80 level. In contrast, U.S. imports will remain relatively low in view of the record orange crop.

Grapefruit.—Prospects for U.S. grapefruit production during the 1980-81 season (for California, including desert valley fruit only) point to a crop of 68.7 million boxes, 2 percent less than last season but 6 percent more than the 1978-79 season. Smaller crops are currently expected for all producing areas except Texas.

Florida's grapefruit crop is forecast at 53 million boxes, 3 percent less than last season. The crop in California desert area is forecast at 3.8 million boxes, down 10 percent. The Arizona crop, at 2.9 million boxes, is 3 percent less than in 1979-80. Texas growers expect to harvest 9 million boxes, 14 percent more than last season's small crop.

Carryover stocks of most processed grapefruit products are up going into the 1980-81 season. Sales of chilled and frozen concentrated grape-

fruit juices have shown good growth in recent years. Thus, processor demand is expected to be relatively good despite larger stocks. The smaller crop and relatively good demand in prospect combined with a potentially good export market will keep grapefruit prices firm. The recent gain in the Japanese yen relative to U.S. dollars could enhance grapefruit exports to that market during the coming season. However, the record orange crop could exert some downward pressure on grapefruit prices.

Lemons.—The Arizona-California lemon crop is forecast at 25.9 million boxes, 25 percent above last year's crop and 32 percent larger than the 1978-79 crop. California's crop, at 20 million boxes, is up 13 percent from 1979-80. In Arizona, a crop of 5.9 million boxes is expected, 93 percent greater than the small crop of 3.05 million boxes harvested last season and 7 percent above the 1978-79 crop.

Because of the larger crop, total movement through mid-October was sharply ahead of last season's pace, primarily reflecting the sharp increase in processing use. Deliveries to the fresh market have also been substantially larger, while shipments to export market were only slightly above last season's pace. In response to a larger crop, f.o.b. prices for fresh lemons were quoted at \$9.78 a carton in mid-October compared with \$11.92 a year earlier. So far this season, lemon prices have averaged 36 percent below a year earlier and are expected to continue to average lower this season than in 1979-80.

Processed citrus fruit

Because of the record 1979-80 citrus crop, the amount of processing use totaled 12.4 million tons, up 27 percent from 1978-79. Processing use also increased its share of total production to 75 percent, compared with 74 percent during 1978-79. More than four-fifths of the oranges sold were processed and approximately half of the lemons. Likewise, 61 percent of the grapefruit sold in 1979-80 was processed, up from 58 percent in 1978-79.

The record Florida orange crop and relatively high juice yield (1.33 gallons of 45 degree brix concentrate per box) resulted in a record pack of frozen concentrated orange juice (FCOJ) for the 1979-80 season. The total pack reached 231.1 million gallons (excluding re-processed gallons), up almost 34 percent from last season. Thus, despite sharply higher imports, the total supply of FCOJ during 1979-80 was almost 20 percent larger.

Because of larger supplies, Florida citrus packers have had several promotional allowances to reduce f.o.b. prices for FCOJ. The lowest level of \$2.80 per dozen 6-ounce cans (f.o.b. Florida canneries) was offered in early June. The current price is quoted at \$3.25, compared with \$3.55 to \$3.60 last year. During the promotional allowance, movement improved considerably. However, sales, although up, have not kept pace with processing, so as to October 11, the stocks on hand were 79.4 million gallons, up 32 percent from a year ago. It appears that carryover will approach 50 to 60 million gallons, compared with 37.4 million last season. The record U.S. orange crop and relatively high juice yield likely from Florida oranges will result in another large pack of FCOJ. In addition, Florida packers will reduce the concentration of FCOJ brix from 45 degrees to 43.4 degrees at the

start of the new packing season and the change will lead to additional pack. Thus, total supplies of FCOJ during the coming season will be large and FCOJ prices are expected to weaken.

In a continuation of the uptrend, Florida packers in 1979-80 processed another record of 234.8 million gallons of chilled orange juice (excluding single-strength reprocessed), 14 percent more than in the 1978-79 season. At the same time, total movement also set a record of 233.8 million gallons, also up 14 percent from last season. However, the carryover at the end of the season at 16.7 million gallons, was moderately above year earlier levels. In view of the large Florida orange crop, another record pack of chilled orange juice is expected. Movement will continue to increase and prices will ease somewhat.

Fresh noncitrus

The 1980 noncitrus fruit crop, including 10 major fruits, is forecast at 13 million tons, 2.3 percent above last year and 11 percent larger than 1978. Larger crops of apples, grapes, and prunes and plums are primarily responsible. Shipping point prices for most fresh noncitrus fruit have declined below a year ago. Despite the larger carryover of many processed fruits, processor utilization has been relatively good and is expected to continue so for the rest of the season, reflecting good demand both here and abroad. Still, noncitrus supplies available for the fresh market will be up, and grower prices of noncitrus for the fresh market are expected to average less than last year.

TABLE 6.—U.S. NONCITRUS FRUIT: TOTAL PRODUCTION, 1978, 1979, AND INDICATED 1980

[1,000 tons]

Crop	1978	1979	1980
Apples.....	3,804	4,045	4,160
Apricots.....	126	145	124
Cherries, sweet.....	155	184	164
Cherries, tart.....	91	85	113
Cranberries.....	124	124	128
Grapes.....	4,567	4,989	5,073
Nectarines.....	148	172	185
Peaches.....	1,348	1,489	1,454
Pears.....	727	862	888
Prunes and plums.....	634	655	757
Total.....	11,724	12,750	13,046

Source: Crop Production, CRB, ESS.

Apples.—The final forecast of the 1980 U.S. apple crop is a record 8.32 billion pounds. This is 3 percent above the record 1979 total. Prospects in the Eastern States are up slightly with New York and Pennsylvania up 3 percent and 7 percent respectively, but the Virginia crop is expected to be 17 percent smaller. The Central States expect to harvest a crop 23 percent larger, while the Western States are down 2 percent. Washington, the leading apple producing State in the Nation, expects a record 2.6 billion pounds, up almost 2 percent from 1979.

Because of the record crop, shipments of fresh apples are running moderately ahead of last year's pace. Supplies of apples for fresh market are expected to be ample this season, since processors have

substantially larger inventories of processed apple products and will not bid for apples aggressively this year.

In general, opening f.o.b. prices for fresh apples at major shipping points are moderately to substantially higher than a year ago, but they have declined with increased volume. In mid-October, prices at several shipping points were below year-earlier levels. As supplies continue to increase this fall, weakening processor demand and the larger fresh supply available from Eastern and Central States will dampen apple prices. Furthermore, the record orange crop in prospect particularly from California, will exert some additional downward pressure on apple prices. However, if export demand continues to be good, apple prices received by growers may hold relatively firm. The outlook for export demand for all apples is mixed this season. Export prospects to Canada, an important destination, are not bright, because the Canadian apple crop is expected to increase 7 percent from 1979. However, exports to some other major areas may still hold relatively good, particularly the Middle East and Latin America.

Prices for processing apples have been negotiated below the higher levels of last season. Offering prices are considerably lower in all producing areas, mainly reflecting slackening processor demand and larger crops in major processing States.

Cranberries.—The 1980 cranberry crop is estimated to be a record 2.56 million barrels, 3 percent larger than the 1979 crop. A record crop of 1.01 million barrels expected from Wisconsin is chiefly responsible. Massachusetts, the leading producing State, anticipates a crop of 1.1 million barrels, the same as a year ago. Despite the larger crop, season opening prices for fresh Massachusetts cranberries in Chicago wholesale markets were sharply higher than a year earlier. They are expected to decline as the season progresses. Even with a large crop, prices for canned cranberry sauce are not likely to decline in view of higher costs of processing and berries. There will be good supplies for the holiday season.

Grapes.—This season's U.S. grape production is forecast at a record high 5.07 million tons, 2 percent larger than the record 1979 crop. California's crop is forecast at 4.61 million tons, up 1 percent from 1979 as larger crops of raisins and table varieties more than offset smaller output of wine variety.

Total grape production from States other than California is estimated at 463,000 tons, up 8 percent from last year, with larger crops expected for all States except Arizona and Michigan. Estimated production in New York, at 175,000 tons, is 6 percent larger than 1979. Prospects in Washington are for a crop of 127,000 tons, up 25 percent from last year. All together, production from these States accounts for 9.2 percent of the total crop, compared with 8.7 percent a year ago.

Through mid-October shipments of fresh table grapes were running sharply above last year's pace. Consequently, shipping point prices for most California grapes have declined seasonally from the high levels early in the season. In mid-October, Ribier was quoted at \$8.67 per 23-pound lug in the Central San Joaquin Valley, Calif., compared with \$7 last year. F.o.b. prices for table grapes are likely to remain higher as supplies decline seasonally and consumer demand remains strong. Despite a larger crop, the field price for raisins in California

has been settled between growers and processors at levels moderately higher than a year ago. Wholesale prices of wines have remained well above a year ago. The BLS September wholesale price index for all wines stood at 216.7 (1967=100), up 14 percent from a year earlier. Prices are expected to continue to rise, since higher wages were settled upon between wineries and wine workers after strikes in September.

Pears.—The final forecast of the 1980 U.S. pear crop is 888,000 tons, 3 percent larger than the 1979 crop. Larger available supplies of Bartlett pears have resulted in lower prices at the shipping point in California. However, even with substantially larger carryover of canned pears at the beginning of the season, growers and canners in California agreed to a field price of \$175 per ton for No. 1 grade Bartletts, compared with \$172.50 a year ago. Likewise, the Washington-Oregon Canning Pear Association reported the cannery price for No. 1 Bartletts, $2\frac{1}{4}$ inches and larger, at \$175 per ton, compared with \$170 last year. Because of the larger crop, prices for fresh winter pears are not expected to be as strong as last year. In addition, the record apple crop could dampen pear prices.

Processed noncitrus

The slightly larger noncitrus crop is expected to result in a 1980-81 pack slightly above last year's. Including the larger carryover at the beginning of the season, total supplies of canned noncitrus products will be ample. Supplies of dried fruit, particularly prunes and raisins, are expected to be adequate, and frozen fruit and berries will also be up because of larger berry and cherry deliveries to processors. However, even with increased supplies, prices are expected to remain firm for most processed items because of higher costs of fruits, processing, marketing and distribution.

Although the packing season is not over, the 1980-81 pack of most canned fruit is expected to be larger than last year. Complete pack data available so far indicates that the pack of canned apricots from California totaled 3 million cases (24 No. $2\frac{1}{2}$'s), up 4 percent from last year. The unaudited pack data indicate larger packs for both canned clingstone and fruit cocktail in California. The total pack of canned Bartlett pears this season is also expected to be larger than last year in view of a larger crop. The increased utilization of tart cherries for canning in Michigan and New York has resulted in a total pack larger than 1979—545,472 cases (24 No. $2\frac{1}{2}$'s), up 4 percent from a year ago. Carryover of canned apple products was well above a year ago. Thus, the larger apple crop in major processing areas will result in large supplies of canned apple items.

Despite larger supplies, wholesale prices of most canned deciduous fruits have been above year-earlier levels. The BLS September wholesale price index of canned fruit was 233.7 (1967=100), up 6 percent. Since most fruit prices contracted are higher and the cost of processing continue to rise, wholesale prices are expected to remain firm. However, there will be occasional promotional price reductions to stimulate sales.

U.S. dried fruit production for the 1980-81 season is expected to total above a year earlier. The total raisin tonnage is currently estimated at 308,000 tons, slightly above last year. Production of dried

prunes, the other major dried fruit item, is placed at 165,000 tons, 22 percent above last season. Including considerably larger carryover, supplies of dried fruit are expected to be well above last season.

With larger supplies in prospect, wholesale prices of dried fruit are likely to remain steady. The BLS September wholesale price of raisins at \$24.50 per case (24 packages, 15 ounces each), is down 19 percent from a year earlier. Wholesale prices of dried prunes was \$17.59 (24 packages, 16 ounces each) in September, compared with \$17.07 a year earlier.

The 1980 pack of frozen deciduous and berries is expected to surpass the 533.8 million pounds packed in 1979. Deliveries of strawberries to freezers totaled 194.3 million pounds through early October compared with 186.9 million pounds a year ago. In addition, freezers' receipts of blackberries mainly from Oregon, have been sharply above last year. The larger tart cherry crop has resulted in a sharply larger pack of frozen cherries. Packing in Michigan accounted for most of the increase. However, even with a larger crop, freezers' receipts of blueberries have been near last year's levels.

Cold storage holdings of frozen fruit and berries (excluding juices) on October 1, totaled 624.5 million pounds, an increase of 13 percent from a year ago. Sharp increases in tart cherries and strawberries are chiefly responsible. Despite larger supplies, the September wholesale price of frozen strawberries, at \$6.18 per dozen, 10-ounce packages, was up 3 percent from last year. Prices are likely to remain firm throughout the season because of higher costs of berries and processing.

Tree nuts

The 1980 crop of the four major edible tree nuts—almonds, filberts, pecans, and walnuts—is estimated at 606,900 tons (in-shell basis), 4 percent smaller than 1979. Filbert and walnut crops are forecast to be larger than last year, while the pecan crop will be 7 percent smaller. The almond crop is expected to be 10 percent below last year's record crop. Prices for almonds are expected to remain firm in view of good world demand and the smaller crop. However, larger crops in Spain and the Mediterranean countries probably will have a moderating influence on world prices. With good world prices in prospect and smaller crops of almonds and pecans, grower prices for walnuts this season may remain relatively firm despite the larger crop. A smaller pecan crop combined with sharply smaller carryover will keep grower prices above year-earlier levels. Boosted by higher world prices and smaller tree nut production, filbert prices received by growers are expected to be above 1979.

Per capita fruit consumption

Total per capita fruit consumption in 1979 reached 223 pounds (fresh weight equivalent) 5.3 pounds, or nearly 3 percent, above 1978. An increase in noncitrus consumption more than offset a decline in citrus consumption.

Per capita consumption of all fresh fruit increased from 83.3 to 84.6 pounds between 1978 and 1979 due entirely to the increase in noncitrus consumption. Despite higher prices, consumption of bananas—the leading fresh fruit—increased from 20.6 pounds in 1978 to 21.4 in 1979. Consumption of fresh apples—the second leading fresh

fruit—rose even more from 16.1 pounds in 1978 to 17.3 in 1979, an increase of 8 percent. These two fruits accounted for almost 46 percent of total fresh fruit consumption in 1979, compared with 44 percent a year ago. The per capita fresh citrus consumption declined 2.2 pounds from 1978 to 24.8 pounds in 1979. The reduction was primarily caused by reduced availability of fresh citrus as a result of freeze damage to California and Texas citrus crops.

Per capita processed fruit consumption (fresh weight equivalent) showed a moderate increase from 134.4 pounds in 1978 to 138.4 in 1979 primarily reflecting larger consumption of raisins and canned apple juice. Per capita processed citrus fruit in 1979 consumption increased 0.4 pounds to 89 pounds (fresh weight equivalent) because of larger FCOJ consumption.

Total per capita fruit consumption—fresh and processed—in 1980 is expected to be slightly more than the 223 pounds consumed in 1979. Per capita consumption of all fresh fruit will increase moderately with the increases expected for both fresh citrus and noncitrus fruits. Per capita processed citrus consumption, particularly FCOJ, will also be up moderately, while that of processed noncitrus fruit consumption is expected to be near last year's level.

TABLE 5.—PER CAPITA CONSUMPTION FOR TOTAL, FRESH, FROZEN, CANNED AND CHILLED, AND DRIED FRUIT
1977, 1978, 1979 AND ESTIMATES FOR 1980
[Pounds, per capita, fresh weight equivalent]

Year	Total	Fresh	Frozen	Canned and chilled	Dried
1977	224.5	83.3	73.1	58.4	9.7
1978	217.7	83.3	63.3	62.9	8.2
1979	223.0	84.6	64.4	62.3	11.7
1980 ¹	225.2	85.4	65.2	62.7	11.9

¹ Estimated.

OUTLOOK FOR VEGETABLES AND POTATOES

(By Jules V. Powell, Agricultural Economist, Economics and Statistics Service,
U.S. Department of Agriculture)

GENERAL PRICE PROSPECTS

Higher vegetable prices reflect smaller supplies

Smaller supplies of both fresh and processed vegetables this season will spur higher prices for both producers and consumers. Supplies of fresh vegetables for 1980 are approximately 10 percent smaller than last year and processors have used about 11 percent less. Prices paid by growers for fresh market vegetables will advance seasonally this fall and average substantially higher than a year ago. From now through the middle of next year retail prices for processed vegetables will average moderately higher than last season, reflecting tighter supplies, higher processing costs, and increased demand.

Prices received by growers for fresh and processing vegetables through the final quarter of 1980 were substantially lower this year than last because of large supplies on the market. Prices rose in April, however, as the smaller spring and summer crops became apparent, and have remained above the year-earlier levels. They are expected to remain higher through the first half of 1981. Meanwhile, wholesale prices for canned vegetables hovered near the year-earlier levels until June when smaller prospective packs were assured. Prices rose in June and in September averaged 9 percent higher than a year ago. With supplies of canned vegetables about 6 percent smaller during the 1980-81 season, prices will remain substantially above year-earlier levels.

The supply-price picture for frozen vegetables is about the same—supplies will be tighter and prices will be substantially higher than last year. Increased processing and marketing costs, in particular, will raise prices for frozen vegetables relatively higher than for canned.

The retail price index for processed vegetables for the third quarter of 1980 was estimated at 118.0 (December, 1977=100) up about 6 percent from a year earlier. If current estimates of 1981 supplies are accurate, the index is expected to rise another 11 percent through 1981 as rising processing and marketing costs augment higher raw product costs.

FRESH VEGETABLES

The 1980 supply of fresh vegetables and melons varied among seasons with increased supplies in the winter quarter and smaller supplies in the spring, summer, and fall quarters. The substantially larger winter crop was partially offset by a 15-percent reduction in imports during the January-March period. Smaller supplies in the spring,

summer, and fall quarters resulted from a reduction in harvested acreage.

Acreage for fall production of 14 major fresh vegetables is estimated to be 1 percent less than in 1979. Based on average yields, projected production of these vegetables is 45.5 million hundredweight, 4 percent less than last year. Larger production is expected for snapbeans, cauliflower, sweet corn, cucumbers, eggplant, and escarol-endive. Smaller production is projected for broccoli, cabbage, carrots, celery, lettuce, green peppers, spinach, and tomatoes.

Higher prices in 1980-81

Fresh market vegetable prices to growers during the winter quarter of 1980 were sharply below those during the same period a year earlier and were the lowest in several years. In April, farm prices rose above year earlier levels and have remained above through September. The index of prices received for fresh market vegetables stood at 210 (1967=100) in the third quarter of 1980, compared with 188 a year earlier.

QUARTERLY INDEX OF FARM PRICES FOR FRESH VEGETABLES¹

[1967=100]

Year	1st	2d	3d	4th	Annual
1972	134	126	123	133	129
1973	160	193	145	126	156
1974	143	164	144	159	152
1975	168	183	164	177	173
1976	184	158	169	182	173
1977	251	183	165	188	197
1978	202	258	189	189	209
1979	265	207	188	199	215
1980	196	228	210	210	210

¹ Excludes potatoes.

Source: Agricultural prices, ESS, USDA.

QUARTERLY RETAIL PRICES FOR FRESH VEGETABLES¹

[1967=100]

Year	1st	2d	3d	4th	Annual
1972	137	134	128	133	133
1973	151	167	153	138	152
1974	150	160	152	151	153
1975	168	169	165	160	166
1976	170	168	165	179	170
1977	221	216	178	184	200
1978	212	247	209	204	218
1979	254	224	211	226	229
1980	220	250	231	231	231

¹ Excludes potatoes. Consumer Price Index—All Urban.

Source: USDA estimates derived from Consumer Price Index.

For the remainder of 1980, grower prices will rise seasonally and continue about 8 percent above year-earlier levels during the fourth quarter. Retail vegetable prices in 1980 followed grower price patterns but were somewhat less volatile. Demand for fresh vegetables was weak during the first quarter but strengthened in the spring and summer.

Demand is expected to remain strong this fall and winter. The third quarter 1980 ESS index of retail prices, at 230.9 (1967=100) was 9 percent higher than a year earlier.

PROSPECTS FOR LEADING ITEMS

Onions

Production of summer storage onions this year is estimated at 17.3 million cwt., 14 percent below the 1979 total. Production of nonstorage and storage-type onions in summer producing States is estimated at 29.3 million cwt., 10 percent below last year. (This total includes California onions which are used primarily for processing.) The decrease in production resulted from a 5-percent decrease in overall harvested acreage and a 5-percent decrease in average yields. For storage onions only Minnesota and Western Oregon showed increases in harvested acreage, while only Minnesota and Ohio showed increases in yields. Idaho and Oregon indicated no increases in yields.

For 1981, Texas spring crop onion growers intend to plant 19,000 acres, the same as in 1980 but 22 percent less than in 1979. In the Rio Grande Valley of Texas, rainfall during September helped alleviate dry conditions. There were some rain delays, but land preparation and planting got into full swing during early October. In the Winter Garden and Laredo areas, conditions remained dry despite showers in September, but plantings were on schedule in October.

Sweet corn

Most of the sweet corn during the fall quarter comes from the Florida Everglades, where 13,400 acres are expected to be harvested this year, 11 percent more than in 1979. California acreage is down, however, so total fall production is up only 9 percent. Based on average yields, the fall crop of sweet corn is expected to total 1.06 million cwt., 18 percent more than last year's production. With a larger Florida crop, consumers in the East will find more sweet corn in the stores this fall. Consumers in the West will find fewer supplies available.

Lettuce

With both California and Arizona showing a reduction in acreage, the fall 1980 crop, at 62,200 acres will be 3 percent smaller than in 1979. With average yields, production of fall lettuce is estimated to be 14 million cwt., 4 percent below last year.

In New Jersey, despite early dry weather, good volume was available through most of October, with marketing completed by early November. In the Florida Everglades, planting was interrupted by frequent rains. Harvest of the fall lettuce crop in Arizona's southeastern area began the last week of September. The crop is in generally good shape, although unusually high temperatures caused some leaf burn on young plants. Central Arizona began harvesting in October and Western Arizona will begin harvesting in November. The California fall harvest began in the Salinas-Watsonville and Santa Maria areas and shifted to the southern and central San Joaquin Valley during the latter part of October. Harvest in the Blythe area will begin in mid-November.

Lettuce prices are extremely volatile and may vary widely from day to day, depending on weather, labor disputes, or the availability

of transportation. According to trade sources, a recent 10-day labor strike against a large California lettuce shipper was settled with a new 3-year contract calling for a minimum wage of \$5.85 per hour the first year, followed by raises of 55 cents and 40 cents per hour for the next 2 years. There was also an increase in the piece rate, allowing workers now to make between \$7 and \$12 per hour, depending on the job classification. In spite of this strike, prices for iceberg-type lettuce at California shipping points have been generally lower than a year ago. For the week ended September 27, prices f.o.b. Salinas Valley, average \$4 per carton (24 heads) compared with \$6.75 a year earlier. With a slightly smaller crop in prospect, prices should strengthen and rise above their recent low levels.

Tomatoes

U.S. acreage of fall tomatoes is estimated at 25,100 acres, 4 percent more than in 1979. With average yields, production is expected to be 5.55 million cwt., 4 percent below a year earlier. The Florida crop is in fair to very good condition. A light harvest in the Palmetto-Ruskin area began in late October. Fresh market tomato harvest is active in all producing areas of California. Heaviest movement of the fall crop is expected from the south coastal areas. California and Florida account for more than 95 percent of the U.S. production of fall tomatoes. Small amounts are marketed by Alabama and Texas.

Prices for fall tomatoes will rise seasonally through November and December. With a potentially smaller crop prices may stay above last year's level. For the week ended September 27, two layer flats (4×5-5×6's), f.o.b. Southern California shipping points were priced at \$6.90 compared with \$4.20 a year earlier.

PROCESSED VEGETABLES

Smaller supplies of processed vegetables

The area contracted for production of seven major processing vegetable crops in 1980 is estimated at 1.3 million acres, down 12 percent from 1979. Raw tonnage production under contract will approximate 9.8 million tons, about 15 percent less than was produced last year. Production declines are expected for green lima beans, snap beans, beets, sweet corn, green peas, winter spinach, and tomatoes. Only spring spinach shows an increase. Highlighting this season are substantial decreases in contracted tonnage for green lima beans, down 31 percent; beets down 20 percent; tomatoes, down 16 percent; and sweet corn, down 10 percent. Contracted acreage for cabbage for kraut, cucumbers for pickles, and fall spinach will be reported later.

The carryover of leading canned vegetables at the beginning of the new pack year was nearly one-fifth larger than last year. Stocks of frozen vegetables on October 1, at 1.7 billion pounds, were 12 percent below year-earlier levels. The data on contracted acreage are not categorized for canning or freezing, but the current stock positions indicate both outlets will have about the same percentage decreases. Most of the decrease in canned tonnage will come from snap beans, beets, and green peas. Stocks of green peas are heavy because of a large carryover from last season. With smaller packs more than off-

setting larger carryover stocks, supplies of both canned and frozen vegetables will be down about 6 percent from a year ago. Smaller supplies, combined with increased processing and marketing costs, will spur higher wholesale prices for both canned and frozen vegetables for the remainder of 1980 and through the first half of 1981.

Higher raw product costs and increased processing and marketing costs will boost both the wholesale and retail prices. Some of these costs have risen substantially during the past year. For example, the index of packaging materials costs was 262.7 (1967=100) in August 1980, up 13.4 percent from August 1979. During a comparable period, the index of prices for fuel and power rose 31.5 percent. Labor costs are up 10.5 percent in 1980 and the monthly index of transportation costs in August stood at 306.1 (1967=100), 22.5 percent above a year earlier.

Much of the decrease in processing vegetable tonnage is coming from California tomatoes, which do not compete directly with other fresh and processed vegetables. However, there are smaller crops of nearly all of the other processing vegetables, which are often substituted for each other depending on relative prices. For example, the relatively large supplies of green beans this year will tend to moderate price rises for corn, peas, and other canned vegetables.

The total supply (pack plus carryover) of canned vegetables for 1980-81 will probably be about 6 percent smaller than last season's large volume. This drop is resulting from smaller packs of the major vegetable items, since carryover stocks of all items combined were estimated to be nearly a fifth larger than a year earlier.

Despite inflation, wholesale prices of canned vegetables remained at or below year earlier levels through the first half of 1980 but then began to increase in July when the smaller 1980 pack became apparent. In September, the index of prices for 10 leading vegetables stood at 211.1 (1967=100), up 9 percent from a year earlier. With smaller supplies and few promotional allowances, wholesale prices will be moderately higher this fall and winter than a year earlier. Smaller supplies of both canned and frozen vegetables plus increased processing and marketing costs will also keep retail prices moderately above those of last year. Stocks of frozen vegetables on October 1 stood at 1.7 billion pounds, 12 percent less than in 1979.

PROSPECTS FOR LEADING ITEMS

Peas

The volume of peas available for canning and freezing this year is estimated at 474,820 tons, and the combined pack of canned and frozen peas is substantially smaller than last year. However, total supplies of processed green peas will still be adequate because of a large carry-over from 1979's record-large packs. Thus, while total supplies of canned green peas are 9 percent smaller than in 1979, supplies are still expected to be 17 percent larger than during the 1978-79 season.

The 1980 pack of frozen peas is estimated at about 350 million pounds, down a fifth from last year's large pack of more than 442 million. Prices are expected to remain at current levels with minor upward price adjustments to cover increased marketing costs.

Lima beans

Lima bean tonnage for canning and freezing is estimated at 57,390 tons 31 percent below the 1979 level. A sharp drop in contracted tonnage in California accounts for most of the decrease, but nearly all States reported declines.

The carryover of canned lima beans on August 1 was nearly 600,000 cases, a fifth larger than the previous year. With both yields and acreage down this year, the total pack will be down sharply and total supplies will be down a fourth from a year ago. These short supplies plus increased costs, will boost prices well above year-earlier levels throughout the fourth quarter of 1980 and the first half of 1981.

Snap beans

The estimated 1980 tonnage of snap beans for canning and freezing, at 656,340 tons, is 9 percent smaller than a year earlier. The carryover of canned green beans, at 9.1 million cases (24-303's), however, is larger than during either of the past 2 years. The 1980 pack is expected to total about 60 million cases, bringing the total supply to nearly 70 million cases, down slightly from 1979's large total but well above 1978 supply. Prices are expected to remain near year-earlier levels, with some price concessions along the way.

Stocks of frozen green beans totaled nearly 236 million pounds on October 1, substantially more than 1 year ago. With total supplies of green beans expected to be down only slightly from last year's large supplies, prices will probably remain near those of last year.

The 1980 pack of frozen green beans has been completed. The Pacific Northwest and California accounted for 52 percent of the total pack, the Midwest freezers 10 percent, and the East and South 38 percent.

Sweet corn

Processing volume of 2.19 million tons is 10 percent smaller than 1 year ago. Most of the processing States reported declines in production; only Maryland, Minnesota, Pennsylvania, and other minor producing States showed slight increases. Idaho, Oregon, and Washington, which do most of the freezing of corn, are showing declines.

With a sizable but not burdensome carryover of canned corn, and the smallest pack since 1974, total supplies will be approximately 10 percent smaller than 1 year ago. Smaller supplies and higher processing costs mean higher prices this marketing season. Increased prices will keep total disappearance below last year's record of 60.2 million cases (24-303's), but next season's carryout should be in the 5-7-million-case range and contracted acreage will likely be increased next spring.

The combined carryover of cut and on-cob frozen corn was nearly a fourth smaller in 1980 than last year. Stocks on October 1 totaled nearly 562 million pounds, 25 percent smaller than 1 year ago. With reduced carryover stocks and a smaller pack, prices for frozen corn are expected to rise substantially above the low levels of last year.

Tomatoes

Substantial reductions in tomato acreage, particularly in California, and reduced yields in some other processing States, are responsible for a substantial reduction in tomato tonnage this year. California is still

expected to produce about 88 percent of the processing tomatoes. Contracted tonnage in other States was also down from year-earlier levels, and these decreases were amplified by hot, dry conditions in eastern producing areas. As a result, contracted tonnage was off 25 percent in Maryland, 35 percent in New Jersey, and 56 percent in Virginia. In Indiana and Ohio—California's two major competitors—tonnage was off 2 and 18 percent, respectively.

Deliveries of tomatoes to canners in California totaled approximately 5.4 million tons for the season to October 4, down from with 6.2 million tons last year. The trade is now looking for a final tonnage of 5.6 million tons in California compared with a total of 6.3 million tons 1 year ago.

Light deliveries, combined with a relatively light carryover from the 1979 crop, portend tight supplies and higher prices for canned tomatoes and tomato products this marketing season. As early as August, California Standard Grade peeled tomatoes were wholesaling at \$9.25 per case (6/10's), up from \$7.50 in August 1979.

Other processed vegetables

Contracted acreage for canning beets totaled 14,310 acres and 198,600 tons in 1980, down substantially from both 1978 and 1979. The smaller pack from this tonnage will be offset by a record large carry-over of 6.7 million cases (24/303's), yielding a record supply of about 17 million cases in the 1980/81 marketing year. Prices are expected to remain near year-earlier levels throughout the marketing season.

Frozen broccoli stocks on October 1 totaled 105 million pounds, nearly 18 percent more than in 1979. However, continued strong demand for frozen broccoli is expected to keep prices moderately higher than 1 year ago. Stocks of frozen cauliflower—a close substitute for broccoli—were down 31 percent on October 1 but the processing season was just getting started. Stocks of frozen brussel sprouts on October 1, at 23 million pounds, were 23 percent larger than 1 year ago. Volume production was underway in October in California, where freezers were expecting production to be about 10 percent less than last year. Retail prices for nearly all frozen vegetables are expected to be moderately higher than 1 year ago because of higher processing and marketing costs.

VEGETABLE CONSUMPTION

Fresh vegetables and melon use up in 1979

Per capita use of fresh vegetables and melons increased in 1979 to 124.5 pounds. Fresh vegetable consumption rose to 103.8 pounds per person—up from 100.3 in 1978—but melon consumption dipped to 21.4 pounds, down from 22.3 pounds the year before.

Excluding potatoes, the most popular fresh vegetables in 1979 continued to be lettuce, at 26 pounds per person; tomatoes, at 12.7 pounds; and onions, at 11.8 pounds. Both lettuce and tomatoes registered slight declines from the year before, but onion consumption increased.

Processed vegetable consumption up

Consumption of canned vegetables rose to 55.8 pounds per person in 1979, up from 54.2 pounds the year before. Consumption of tomatoes and tomato products—the most important canned vegetables—rose to

23.9 pounds because of the record large pack of tomato products last year. Per capita consumption of frozen vegetables also continued the steady increase to 29.61 pounds, up from 28.44 pounds per person in 1978, and the highest consumption to date.

POTATOES

1980 potato prospects

The 1980 fall crop is estimated at 261 million hundredweight, 12 percent less than in 1979 and 19 percent smaller than the record 1978 crop. This is the smallest crop since 1973. The area for harvest is estimated at 977,000 acres, 9 percent less than last year and 15 percent smaller than in 1978. Yields in 1980 are expected to average 267 hundredweight per acre, 4 percent less than last year and 5 percent below 1978.

In the seven Eastern fall States, production is forecast at 41.4 million hundredweight, down 15 percent from a year earlier because both acreage and yields are lower. Yields, at 232 hundredweight per acre, are down 9 percent, and acreage, at 178,000 acres, is down 7 percent from 1979. In the eight Central States, production is estimated at 53.5 million hundredweight, down 14 percent from 1979 and 23 percent below 1978. The estimated yield of 191 hundredweight is down 11 percent from last year, while harvested acreage is down 5 percent. Yields are down in all States except Wisconsin and Nebraska. Production in the Western States, at 166 million hundredweight, is 11 percent below 1979 and 20 percent below 1978. The average yield, at 319 hundredweight, is about the same as last year, but acreage for harvest, at 519,000 acres, is down 11 percent.

Price and supply implications

With the total fall crop down 12 percent from last year's high level, grower prices will increase and could average in the range of \$4.25 to \$4.75 per hundredweight, up from \$3.24 per hundredweight for the 1979 fall crop. With generally good quality in all areas, grower prices might edge even higher during the first quarter of 1981. Processors anticipate continued growth in exports of processed potatoes—particularly frozen french fries—to Japan. On October 1, stocks of frozen french fries totaled 518 million pounds, 5 percent less than 1 year earlier. With strong demand in both the fresh and processing markets, prices to potato growers will average sharply higher than during the past 3 years.

Per capita use up

Consumption of potatoes in 1979 remained at 118.3 pounds per person as the use of fresh potatoes rebounded to 52.8 pounds and the use of processed declined more than 5 pounds per person. In 1979, consumption of dehydrated potatoes dropped nearly 2 pounds to 9.7 pounds per person. Consumption of frozen potatoes dipped to 36.2 pounds, down from 39.5 pounds a year earlier. Canned chips and shoestrings remained at the year earlier levels of 2.2 and 17.4 pounds per person, respectively.

SWEETPOTATOES

The 1980 sweetpotato crop is forecast at 12.0 million hundredweight, down 17 percent from 1979 and down 16 percent from 1978. This pro-

duction is the lowest since 1971. Harvested acreage is expected to total 113,200 acres, 9 percent below 1979 and 6 percent less than 1978. Estimated yield at 106 hundredweight per acre is down 8 percent from 1979, and 11 percent below 1978.

With cannery carryover stocks at record high levels, there is little incentive to pack heavily. However, grower prices in the processing market have been up. Canner stocks totaled 2.7 million cases on July 1, 1980, up 26 percent from a year earlier. Nevertheless, because of a greatly reduced crop in prospect, cannerys have been paying North Carolina growers \$2.25 to \$2.50 per 50 pounds delivered, up from \$1.50 a year earlier.

MUSHROOMS

Mushroom production in the United States reached a new high during the 1979-80 season, 470 million pounds, 4 percent more than the previous season. Pennsylvania, the leading State, with 45 percent of the 1979-80 crop, grew 214 million pounds, virtually the same as 1 year ago. The U.S. average yield of 3.12 pounds per square foot is 1 percent more than in 1978-79 and the highest since annual data have been published. These higher yields are indicative of the new technologies that have been introduced into the industry in recent years as large conglomerates have been attracted to the production of this increasingly popular item.

Fresh market sales of mushrooms, at 255.7 million pounds, were up 11 percent from the 1978-79 season, and accounted for 54 percent of total U.S. production. The average price received by growers for fresh market mushrooms reached 95.9 cents per pound, an increase of a penny over the year-earlier level.

While fresh market sales continued the long-term upward trend, the total volume processed dipped to 214.3 million pounds and processing's share of the market dropped to 46 percent. The average price to growers of processing mushrooms dropped to 57.6 cents per pound, a decline of 6.6 cents from the 1978-79 season. This drop in price was an indication that the position of U.S. mushroom cannerys was weakening and triggered the American Mushroom Institute to petition the U.S. International Trade Commission (ITC) for relief from imported mushrooms. On October 17, the President determined that the duty on imports of mushrooms, prepared or preserved, provided for in item 144.20 of the TSUS be raised after October 31, 1980, from 13.3 percent to 33 percent for the first year, then dropped to 28 percent for the second year, and further dropped to 23 percent for the third year. After that, the duty is expected to return to 3.2 cents per pound plus 10 percent ad valorem. Quantitative restrictions were not imposed. The higher tariffs for 3 years should enable the domestic industry to make necessary adjustments to become more competitive.

Per capita use of all mushrooms advanced to 2.9 pounds in 1979-80 (raw equivalent basis), up from 2.7 pounds a year earlier, continuing the steady upward trend in mushroom consumption. Of total consumption, an estimated 1.2 pounds were fresh and 1.7 pounds were processed. Of the processed mushrooms, about half were imported.

Major suppliers of processed mushrooms to the United States are Taiwan, which accounts for 62.3 percent of the total, and South Korea,

with 27.5 percent. Industry sources believe China may become a large supplier of mushrooms to the United States in the years ahead.

The prospects for mushrooms for the 1980's will definitely be impacted by the President's decision on mushroom imports but growth in overall demand for mushrooms will also be an important factor.

DRY EDIBLE BEANS

Dry bean production in 1980 is estimated at a record 24.2 million hundredweight, 17 percent more than last year. The estimated acreage for harvest is 1.79 acres, 26 percent above last year. Average yield was 1,353 pounds per acre, 104 pounds less than last year's 1,457 pounds per acre.

Average prices received by growers reached their low point in April 1980 at \$22.60 per hundredweight. Between April and August, grower prices rose again reaching a high of \$26.30 per hundredweight in August. However, grower prices in September dropped to \$24.50, \$5 per hundredweight above a year earlier. Even though the 1980 crop is 17 percent larger than a year earlier a large portion of the pintos and colored beans, were contracted by the Government of Mexico. Grower prices are expected to be buoyed by strong demand for pintos and other colored beans but may be under pressure by uncertain demand for the white bean classes.

Exports up

Exports of dry edible beans for the September 1979–August 1980 period were 332,889 metric tons, 34 percent above a year earlier. Of the white classes, exports of Navy beans increased 11 percent, Great Northerns increased 4 percent, and other white beans rose 8 percent. Pinto exports (largely to Mexico) and Red Kidney exports were more than double a year earlier.

SUMMARY

Because most vegetables are readily interchangeable with one another at both the production and consumption ends of the marketing spectrum, forecasting supplies and prices of individual items is difficult, if not impossible. We are assured, however, that we will have smaller supplies of processed vegetables during the fall and winter of the 1980–81 marketing season. These smaller supplies, plus higher processing and marketing costs will result in higher prices for both canned and frozen vegetables. Because of higher prices in 1980, larger plantings and increased supplies are indicated for most major vegetables during the spring and summer of 1981. Melon production will rebound next year and keep pace with population growth. Industry sources are hopeful that this year's higher potato prices will not encourage large increases in potato plantings next year. The production of dry edible beans, peas, and lentils are strongly influenced by prospects for exports. The strong export markets of the past 2 years may weaken in 1981. However, the trend for exports of these items is up, so any reduction in production of these commodities will be of a temporary nature.

FOOD GRAINS OUTLOOK

(By Lawrence E. Hall, Foreign Agricultural Service, Bruce H. Wright, Economics and Statistics Service, U.S. Department of Agriculture)

Rising world wheat import demand and reduced global stocks are resulting in higher prices and anticipated record U.S. exports. U.S. carryover stocks will likely be unchanged even with a record wheat crop. Any further significant increase in world import demand in 1980-81 would likely boost U.S. wheat exports with a drawdown in carryover stocks.

The size of the next year's world and U.S. wheat and total grain crops will become of increasing importance in determining price trends. Generally favorable worldwide weather conditions might produce record world and U.S. wheat crops in 1981 with possibly some buildup in U.S. and global stocks. However, significant shortfalls in production in important importing or exporting countries could significantly tighten the world wheat situation in 1981-82, resulting in increased U.S. exports and a drawdown in U.S. stocks.

World and U.S. rice production are expected to set new records this year. World import demand may exceed last year's record mainly reflecting increased Korean rice import needs. Some decrease in U.S. rice stocks is expected as domestic use and exports continue to expand.

WORLD WHEAT OUTLOOK

World production up slightly in 1980

World wheat production in 1980 is currently estimated at 428 million metric tons, up 8 million tons from last year's reduced crop, but still 4 percent below the record crop in 1978. A record area of 234 million hectares was harvested this year, with increases over the previous year in the United States, Canada, the European Community, Eastern Europe, and the U.S.S.R. Yields this year are estimated to be down 1 percent from 1979 and 8 percent from the very good weather year of 1978. Thus, despite a record harvested area, production this year is up only slightly over 1979 and is still less than in 1978 because of less favorable global weather conditions.

Both the United States and the European Community harvested record wheat crops in 1980. Significant increases in production also occurred in other Western European countries, Eastern Europe, and Canada. Major declines in production occurred in Australia, China, and India. The U.S.S.R. is estimated to have suffered a second consecutive poor crop of 90 million tons, 21 million tons below the record 1978 crop.

Utilization declines but still exceeds production

Total wheat utilization this year is estimated at 435 million tons, 7 million tons below last year's record. The biggest drop in the use of

wheat is expected to occur in the U.S.S.R., where a poor wheat harvest and reduced stocks are expected to cause wheat feeding to decline over 10 million tons from the previous year. Smaller wheat crops in China and India are also expected to restrict use of wheat in 1980-81. However, these reductions will be partially offset by estimated increases in wheat utilization in the United States, the European Community, and Eastern Europe, where the coarse grain crops are below the previous year and increased amounts of the record or near-record wheat crops are expected to be fed.

For 3 of the past 4 years, world use of wheat has exceeded world production. Estimated utilization this year is currently expected to exceed production by approximately 7 million tons. In 1979-80, utilization exceeded production by 22 million tons. The U.S.S.R., the world's largest wheat producer, is generally a major factor in this occurrence. In poor crop years, Soviet wheat utilization is greater than production. This results from drawing down either domestically held stocks or stocks held in other exporting countries, through increased Soviet wheat imports.

Stocks decline further

With world utilization expected to exceed production for the second consecutive year, estimated world stocks have been reduced to meet utilization requirements. World stocks at the end of 1980-81 are now estimated at approximately 72 million tons, down 7 million tons from 1979-80 and 30 million tons from 1978-79. However, mainly as a result of continued sizable U.S. stocks, world stocks are still somewhat above the estimated lows of 63-64 million tons reached in the early and mid-1970's.

By the end of 1980-81, total wheat stocks in the major competing exporting countries of Canada, Australia, Argentina, and the European Community are expected to be reduced for a second consecutive year. Furthermore, stocks in Canada, Australia, and Argentina are approaching minimum carryover amounts. Carryover stocks in the United States, however, are not expected to change much from the 2 previous years and should remain substantially above the levels of the 1973-76 period. Stocks in the United States at the end of this crop year are currently projected at 25 million tons, nearly triple the 9 million tons held at the end of the previous record price year of 1973-74.

World trade to set new record

World wheat trade in 1980-81 is currently estimated at a record 90 million tons, up 5 million tons over last year's record and 17-18 million tons over the previous 2 years. The growth in world trade during this period is largely the result of increased imports by the U.S.S.R., China, and the less developed countries. On the supply side, U.S. exports have gone from 31.5 million tons in 1977-78 to an estimated record 41.5 million this year. The European Community's exports during this same period have more than doubled from 5 million tons to an estimated record 12 million tons this year.

This year's projected increase in world trade is due primarily to larger imports by China. Imports are also expected to increase this year in the U.S.S.R., Brazil, and Egypt. However, these increases are

expected to be partially offset by decreases in imports by Bangladesh, Pakistan, the Philippines, and some Western European countries.

Record wheat exports are expected this year for the United States, the European Community, other Western European countries, and Eastern Europe. With diminished stocks—as well as reduced production in the case of Australia—exports by Canada, Australia, and Argentina are currently expected to decline from the previous year.

Further changes in the level of world trade in 1980-81 will primarily depend on the amount of wheat imported by the U.S.S.R. and China and on whether India, which has reduced wheat stocks, will need to enter the world market. Any significant further increases in world import demand would likely be filled by the United States since, with the exception of the European Community, the significantly diminished stocks held by the other major exporters will limit the amount they can increase exports.

Short run outlook

Price developments during the next 6 months will be largely dependent on the outlook for the 1981 crops, the final outcome of the Southern Hemisphere harvests in Australia and Argentina, any significant changes in import demand and on stock and export policies of the major exporters.

With world stocks being drawn down, the size of the 1981 world wheat and other grain crops will be of particular importance in determining how easily needs are met. If global weather conditions are generally favorable, world production might be expected to set a new record and be roughly in balance with world utilization, with the additional possibility of some stock replenishment. On the other hand, significant shortfalls in production, particularly in important importing or exporting countries, could significantly tighten the world wheat situation. Even with a record world crop next year, world wheat trade in 1981-82 is currently expected to remain large. The U.S.S.R. would be expected to continue sizable imports next year, despite a large crop, in order to replenish stock. China is also expected to continue to import large quantities of wheat and the less developed countries are expected to have a continuing growing need for wheat imports.

U.S. WHEAT OUTLOOK

Another record wheat crop means all-time high supply

The 1980 U.S. wheat crop was a record 2.36 billion bushels, up 10 percent from last year. A 14-percent increase in harvested acreage more than offset lower yields—33 bushels per acre compared with the record 34.2 bushels in 1979.

The 1980 U.S. wheat crop developed through a variety of conditions—from drought to excessive rains—but the hardiness of the wheat plant prevailed. On the strength of this crop, total 1980-81 marketing year supplies were 3.3 billion bushels, also the largest ever.

The 1980 Winter wheat crop was planted under dry soil conditions in the Southern Plains but was followed by a mild winter which minimized winterkill. A wet, cool spring caused later maturing of the crop and delayed the harvest, but production was still a record 1.88 billion bushels. The average Winter wheat yield of 36.1 bushels per acre was less than a bushel short of 1979's record although there were marked

regional variations. In the Pacific Northwest, yields increased sharply and helped to produce a record crop. Soft Red yields were record in many Eastern States. Hard Red Winter yields were record high in Western areas but averaged slightly lower in the important Plains States.

Durum growers upped plantings 35 percent last spring in response to higher prices. However, lower yields—down by 5 bushels from 1979 resulted in a crop of 107 million bushels, virtually the same as last year. Cool, wet weather delayed the harvest causing over half of the crop in the Northern Plains to suffer sprout damage.

Growers of other Spring wheat also increased planted acreage by 12 percent. But the same drought conditions and rain-delayed harvest turned a potential record harvest into the smallest crop in 5 years. Total other spring wheat production consisted of 315 million bushels of Hard Red Spring and 61 million bushels of White wheat. Yields averaged 25.5 bushels per harvested acre compared with 28.2 bushels a year ago.

Overall, the quality of the 1980 winter wheat crop—Hard Red, Soft Red, and White—is probably the highest in many years, with increased protein for the hard breadmaking wheats, and optimally low protein levels for the soft pastry wheats. Widespread sprout damage lowered the quality of the Durum and Hard Red Spring supply. White Spring was relatively unaffected.

Wheat exports to expand

The early season export outlook indicated that the growing world demand and reduced availability in some exporting countries would result in another banner year for U.S. foreign wheat sales. At that time, U.S. exports were forecast at 1.45 billion bushels, 5 percent above 1979-80's alltime high. Since then, the outlook has brightened further as import requirements, particularly from China, have been revised upward and dry weather has diminished exportable supply prospects for major producing countries in the Southern Hemisphere. The 1980-81 U.S. export forecast now stands to top 1.5 billion bushels for the first time, over 10 percent above 1979-80.

In early November, total export commitments (outstanding sales plus shipments), represent nearly two-thirds of the season's total projected volume which about matches last year's export activity. However, to achieve the expected 150 million bushel increase in exports this season will require continued heavy export activity during the last half of the marketing year.

Food and feed use may expand modestly

Domestic use in the United States may rise slightly because of continuing growth in food use and some expansion in wheat feeding.

Food consumption of wheat products is still expected to be up slightly—605 million bushels (grain equivalent) compared with 596 million in 1979-80.

Food use of wheat (wheat ground for flour less flour exports) during the June-September period was about on par with a year ago. Flour exports were somewhat below high year ago levels. Millers and bakers, who had expected lower prices because of the record wheat supply, have instead seen cash price advances and record wide basis levels (premium of futures over cash bids).

This year's domestic consumption of Durum in pasta products is likely to show a dip in its market growth trend. Market prices, which have climbed to near \$8 per bushel, reflect a tighter situation for high quality Durum as a consequence of the extensive sprout damage to the crop. Pasta manufacturers are likely to try to hold product cost down by using as much of hard wheat farina and semolina as possible.

For the year, the volume of wheat fed could total 125 million bushels, compared with about 95 million last season. The volume of wheat fed to livestock usually varies inversely with the price of wheat. But it is also responsive to increased quantities of poor quality wheat from a damaged crop and reduced availabilities of feed grains.

June-September wheat feeding was around 50 million bushels, the same as a year ago. Reduced harvest time prices may have prompted some wheat feeding in the Southern Plains while the problem of increased quality damage to the spring wheat crop may have added to the volume fed in the Northern Plains.

Wheat prices advance above year-ago level

During June-July, the prospect of record 1980-71 supplies kept wheat prices below 1979 levels. But cautious producer marketing, and a tightening world wheat situation both in importing and exporting countries advanced prices in September and October to the point where wheat sells for more than it did a year ago.

In late October, the national average farm price surpassed \$4.20 per bushel, releasing about 100 million bushels from the farmer-owned reserve. Another 115 million bushels remain in the reserve with a \$4.50 release price.

With ending stocks expected to be near last year's level, slightly above 900 million bushels, wheat prices will likely follow a normal pattern of seasonal strength through the remainder of 1980-81. For the season, the average farm price may range from \$3.95 to \$4.25, about 10 to 40 cents higher than last season's \$3.82.

Loan activity in 1980 has been higher than a year ago, largely because harvest time farm prices in the Southern Plains slipped as low as \$3.30 per bushel, only 30 cents above the loan rate. However, recent price strength has increased redemptions and slowed loan activity. Northern Plains farmers, whose spring wheat crop suffered significant sprout damage (sample grade), are eligible to receive the standard nonrecourse loan discounted for the damage. As of October 27, 96 million bushels were under loan, 214 million in the reserve, and 195 million owned by CCC.

No set-aside for 1981 crop

The outlook for 1980-81 for continued strong overseas demand with a possible marginal buildup in world wheat stocks assuming trend production and use. Stocks would still remain at low levels relative to world utilization. Thus, the 1981 program is basically unchanged from 1980: no acreage set-aside requirement.

Currently the basic program features include:

Wheat producers who plant with their normal crop acreage (NCA) will be eligible for farm program benefits; that is, loans, target price, and disaster protection and entry into the farmer-owned reserve program.

A preliminary national wheat program acreage (NPA) of 71

million acres. The NPA may be adjusted later in the year depending upon subsequent developments.

Eligibility for full target price payments to those producers who plant no more wheat than was planted for harvest in 1980. Farmers who exceed this acreage would be subject to an allocation factor of between 80 to 100 percent of the acreage planted to wheat.

A loan rate of at least \$3 per bushel which reflects a minimum \$4.20 release and \$5.25 call price for wheat in the reserve program.

A target price, based on preliminary data, of at least \$3.81 per bushel compared with this year's \$3.63.

If conditions are different by next spring and it appears that wheat supplies will be excessive, a paid diversion program could be offered.

Acreage expansion likely

Even though 1980 wheat acreage was at one of the highest levels ever—80.9 million acres, it is likely 1981 acreage will be higher.

Farm prices during the August-September planting decision period were only slightly above year ago levels. However, new crop futures (July 81) looked much stronger relative to the same outlook of the futures market a year ago.

Wheat producers have seen prices hold up well despite the record 1980 crop. With current prospects indicating higher price levels next season, there appears to be little reason for growers to cut acreage. Therefore, 1981 acreage should be as large as last year with strong possibilities that planting could exceed the previous record of 83.9 million set in 1949. Expansion could come from increases in the Corn Belt and Southeastern soft wheat areas and in the Plains States. Continued favorable prices and the expected reduction in spring wheat carryover levels could also cause an expansion in that acreage.

Acreage seeded to winter wheat will be reported in USDA's small grains report to be released on December 23.

Winter crop planted; conditions improve slightly

Winter wheat seeding generally has been completed. Seedbed conditions in the Southern Plains were significantly short of moisture as the normal planting time arrived and seeding with insufficient soil moisture for germination was common. October rains helped germination but concern remains about shortages of subsoil moisture and good growth before winter dormancy. Moisture conditions in the eastern and western soft wheat areas are generally adequate.

WORLD RICE OUTLOOK

World production sets new record

World production in 1980-81 is currently estimated at a record 388 million tons rough basis (262 milled), up 4 percent from 1979-80 and 1 percent over the previous record crop in 1978-79. Record crops in 1980-81 are expected in the United States, Bangladesh, Indonesia, and Brazil. Increases in production are also expected in India and Thailand, which are recovering from reduced crops the previous year. The above increases are partially offset by an estimated 2½ million ton decline in China, the world's largest rice producer, as well as declines in production in Japan and South Korea.

This year's world rice crop is expected to be harvested from a record 145 million hectares, up 2 percent from 1979-80 and 1 percent above

1978-79. Yields this year are expected to almost match the record set 2 years ago.

Utilization expected to equal production, stocks unchanged

Global rice utilization generally increases each year with this year expected to reach a new record of 261 million tons (milled basis), up 5 million tons over last year's record. At this level, utilization is expected to almost equal production, on a milled basis, with a marginal increase in global stocks expected.

Although global stocks are only expected to change slightly, there are some significant changes expected among individual countries. Japan, with a significantly reduced crop and continuing exports, is expected to see its stocks fall by more than 30 percent. More than counterbalancing this decline are expected increases in rice stocks in Indonesia, India, and Bangladesh due to record or near-record crops. As a result of a record crop the United States is expected to have only a marginal decline in its stocks even with record exports and domestic use.

Record world trade

World trade in calendar year 1980 is expected to set a new record of 12.7 million tons, up 900,000 tons over last year's record. The bulk of this increased import demand occurred in South Korea which, in order to meet its needs, had to begin importing rice again in 1979 after a 1-year hiatus. This increase in world import demand is being met by record exports from the United States, as well as some expected increases in Japan's and India's exports.

Calendar year 1981 appears to be another good year for rice trade with import demand currently estimated at about this year's level. Much will depend on the import needs of Indonesia and South Korea. Indonesia, with a record crop this year and increased stocks, is currently expected to cut back its imports by 25 percent or 500,000 tons. South Korea, however, with a significantly reduced crop this year, is currently expected to increase its imports in calendar year 1981 by 80 percent or 800,000 tons.

The United States is expected to increase its exports in calendar 1981 with some increase also possible in Thailand and Burma. Other smaller exporters, however, are currently expected to export less in 1981 than in 1980.

U.S. RICE OUTLOOK

Increased acreage boosted production, yields down

Rice production in 1980, based on November 1 conditions, is estimated at 146 million hundredweight (4.8 million tons, milled basis), 11 percent above last year's revised estimate of 132 million hundredweight (4.3 million tons) and nearly 10 percent above the 1978 record. This increased production reflects a record harvested area of 3.345 million acres and a drought reduced yield of 4,367 pounds per acre.

In 1979, planted acreage exceeded 3 million acres for the first time. Farm prices above \$11.50 per hundredweight in March and April of 1980 caused producers to exceed that by 12 percent this year. Area was up in all producing States with large increases in Arkansas and Louisiana.

The 4,367-pound yield, the lowest since 1973 is down 7 percent from

last year and nearly a tenth below the 1976 record 4,663 pounds. Yields are down in all important Southern producing areas because of the summer drought. In California, early season cool temperatures slowed plant development causing a 5-percent decrease in yields.

Still, rice supplies for 1980-81 will total a record 171.8 hundredweight 5 percent higher than a year ago. The 8.5-million-hundredweight increase results from the 14.5-million-hundredweight increase in production and a beginning stocks level that was 5.9-million-hundredweight below the year earlier level.

Strong demand for U.S. exports

In 1979-80, rice exports reached 84.5 million hundredweight (2.7 million tons, milled basis), 10 percent above the year earlier record. Strong world demand and ample U.S. supplies suggest 1980-81 exports will increase another 10 percent to 84 million hundredweight (3.1 million tons). The record export projection is based on growth in traditional markets including increased shipments to South Korea.

Expanding domestic use

For 1980-81 domestic use is projected to total 50 million hundredweight, a 3-million-hundredweight increase over 1980-81. Food use tends to expand in line with population growth. In recent years, brewers use has increased at a rate slightly above the increase in population and is expected to do so again in 1980-81.

Stock levels compatible with strong prices

Because use is expected to increase slightly more than the larger supplies, stocks levels may be down marginally from last year. Consequently, farm prices of rough rice in 1980-81 are expected to average between \$10.25 and \$11.50 per hundredweight, and may not change much from last year's \$10.60. Prices so far this year are above the 1980 target price of \$9.49 per hundredweight so no deficiency payments are expected.

WORLD WHEAT SUMMARY

[Million metric tons/hectares]

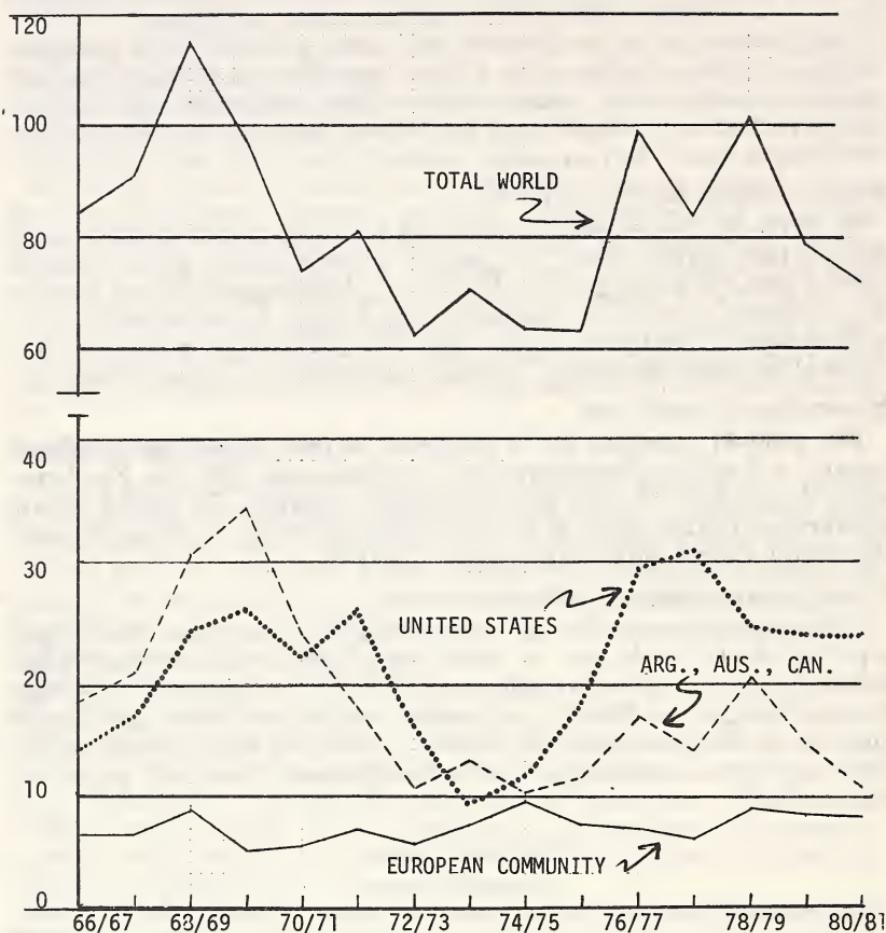
	1976-77	1977-78	1978-79	1979-80	1980-81
Area harvested.....	232.4	225.7	226.6	226.4	234.2
Yield.....	1.79	1.70	1.98	1.85	1.83
Beginning stocks.....	62.8	98.8	84.1	101.7	79.5
Production.....	415.5	383.8	447.9	419.8	428.1
United States.....	58.3	55.4	48.9	58.3	64.3
U.S.S.R.....	96.9	92.2	120.8	90.1	90.0
Utilization.....	379.5	398.5	430.3	442.1	435.4
Ending stocks.....	98.8	84.1	101.7	79.5	72.1
Trade.....	63.1	73.1	71.9	85.4	90.0
United States.....	26.1	31.5	32.3	37.2	41.5

WORLD RICE SUMMARY (MILLED BASIS)

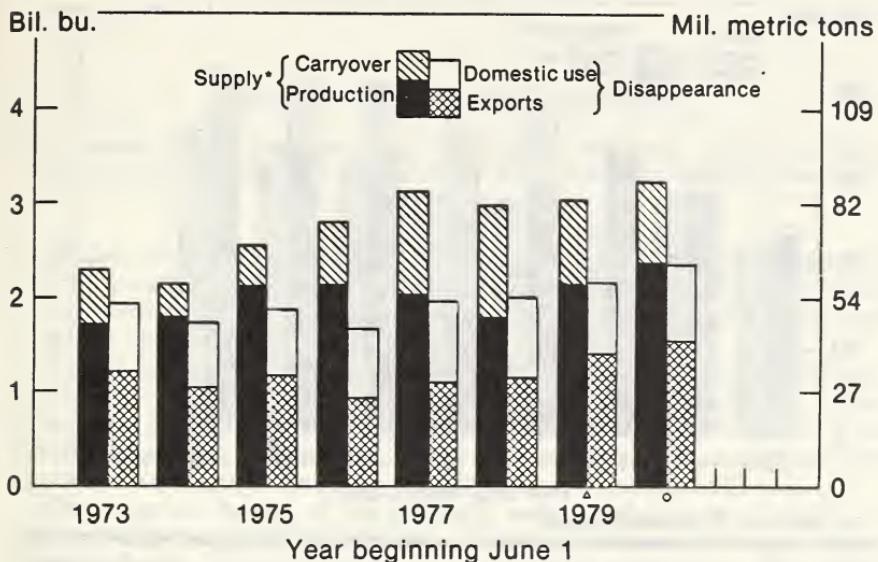
	1976	1977	1978	1979	1980
Area harvested.....	141.6	143.8	143.4	141.7	145.0
Yield.....	2.47	2.58	2.68	2.64	2.67
Beginning stocks.....	18.9	17.6	22.8	27.5	24.0
Production.....	236.2	250.0	259.5	252.5	261.5
China.....	86.7	87.7	93.2	95.5	93.8
India.....	41.9	52.7	53.8	43.5	52.5
United States.....	3.8	3.1	4.3	4.3	4.8
Utilization.....	237.5	244.7	254.7	256.0	260.6
Ending stocks.....	17.6	22.8	27.5	24.0	24.9
United States.....	1.3	.9	1.0	.8	.8
Trade (calendar year).....	10.5	9.5	11.8	12.7	12.8
United States.....	2.3	2.3	2.3	2.9	3.2

WORLD WHEAT STOCKS
1966/67 - 1980/81

MILLION TONS



Wheat Supply and Disappearance

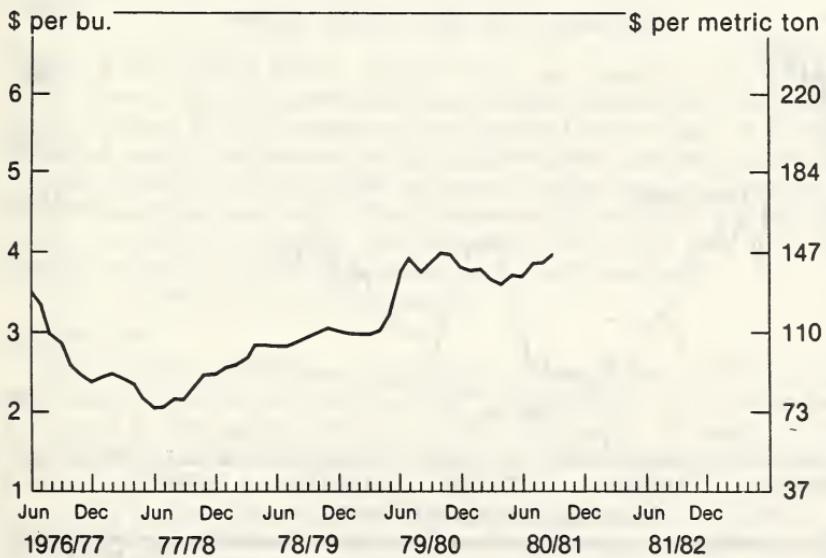


*Includes imports. ^Preliminary. °Projected.

USDA

Neg. ESS 2117-80 (10)

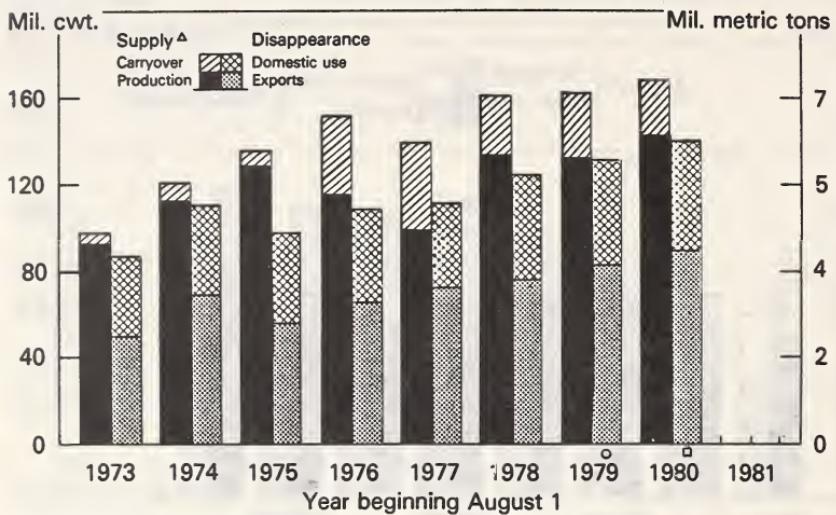
Wheat Prices Received by Farmers



USDA

Neg. ESS 891-80 (10)

Rough Rice Supply and Disappearance

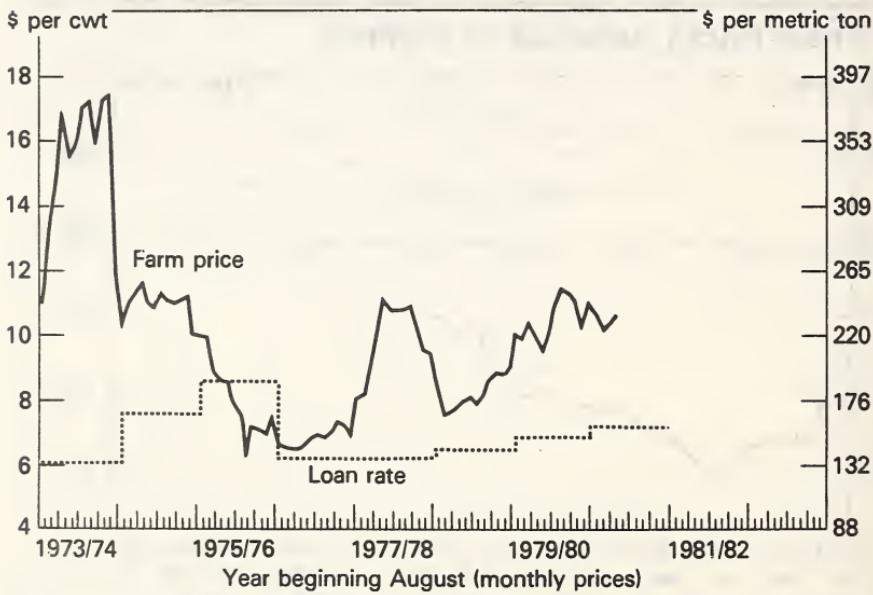


▲ Includes imports. ○ Preliminary. □ Projected.

USDA

Neg. ESS 2119-80(10)

Rough Rice Farm Prices and Loan Rates



USDA

Neg. ESS 408-80 (11)

THE OUTLOOK FOR COTTON

(By Samuel Evans, Economics and Statistics Service, and Gordon A. Lloyd,
Foreign Agricultural Service, U.S. Department of Agriculture)

Cotton, long the king of Southern crops, found itself dethroned and facing a rather bleak future in the late 1960's and early 1970's. But several events have since combined to restore the crop to a renewed position of economic importance in agriculture.

One of the more significant developments in recent years contributing to cotton's resurgence has been the dramatic increase in our export potential. Exports accounted for nearly 60 percent of U.S. cotton disappearance in 1979-80. In the current marketing year, the quantity exported may again equal or slightly exceed domestic mill use.

The economic health of the domestic cotton industry is increasingly influenced by supply conditions in foreign cotton producing nations and by demand conditions in the consuming nations of the world. Accordingly, I will begin this assessment of the cotton economic outlook by reviewing world supply and use prospects for 1980-81. Then, I will discuss the implications of these prospects for the U.S. export market. Following this, I will look at the domestic cotton market. Finally, I will briefly discuss the cotton outlook for 1981-82.

WORLD SUPPLY AND USE PROSPECTS

The fundamental factor determining the potential for export of U.S. cotton is the difference between foreign consumption and production of cotton. Foreign consumption during the first half of the 1970's exceeded use by an average of 2.6 million bales annually. In the last 5 years, however, consumption outpaced production by an average of 7.2 million bales annually. This increasing divergence primarily reflects a slowing in foreign production growth since the mid-1970's. Consumption has continued to increase, but only modestly.

Let's now look at the 1980-81 season.

Production

World cotton production for 1980-81 is estimated at 63.5 million bales, down from 65.6 million last year. A 3-million-bale decrease in the U.S. crop is responsible for the decline (see table). Foreign production is forecast at 51.9 million bales, 1 million above last season. Production in the major foreign exporting countries is expected to reach 24.5 million bales, 0.3 million above 1979-80. Production in the U.S.S.R. is expected to be 13.5 million bales, an increase of 0.4 million over 1979. Production in major foreign importing countries is estimated to be 11.1 million bales, up slightly from last season. Production in the People's Republic of China is estimated at 10.3 million bales, a

0.2-million-bale increase from last season. Area planted to cotton was up 4 percent in China, but heavy rains reduced yields.

Consumption

World cotton consumption in 1980-81 is expected to be 64.6 million bales, nearly a million below last season's record-high level. This decline results from slow economic growth in the industrial nations and high cotton prices. Consumption is expected to be 28.7 million bales in the major cotton-importing countries, 0.7 million below 1979-80.

Consumption in China, the largest importer of U.S. cotton last season, is expected to increase to 13.8 million bales in 1980-81, up from 13.5 million in 1979-80. The Chinese added 500,000 spindles to their cotton spinning system in 1979. Consumption in Japan could decline to about 3 million bales, from 3.4 million in 1979-80. Excess cotton yarn supplies led to a voluntary curtailment in production last April, which is expected to continue through December. Consumption in other important importing countries such as Korea and Taiwan is likely to be near last season's level, but Western Europe will probably use less cotton.

Stocks

Current forecasts project slightly lower world cotton stocks will be carried over into the 1981-82 season. A slight decline in consumption plus smaller production are expected to hold August 1, 1981, world stocks to 20.4 million bales, the lowest level in recent years.

Foreign stocks are expected to decline slightly to 17.6 million bales by the end of the 1980-81 season. Largest foreign reductions are expected in the non-Communist countries. A record cotton crop in the Soviet Union is expected to raise Soviet stock levels. The smaller 1980 crop will reduce August 1, 1981 U.S. stocks to about 2.8 million bales, 200,000 bales below last season, and the smallest level in over a quarter of a century.

THE U.S. EXPORT MARKET

What does this foreign outlook portend for U.S. cotton exports? The forecasts imply a gap between foreign consumption and production in 1980-81 of 6.8 million bales. This is well below the 8-million-bale gap in 1979-80 when U.S. exports were 9.2 million bales. And, foreign-held stocks at the beginning of this season were 0.6 million bales higher than at the beginning of the 1979-80 season.

The difference between foreign cotton supplies—beginning stocks plus production—and foreign consumption is a good barometer of the direction of year-to-year changes in U.S. exports. As figure 1 shows, this difference was 9.7 million bales last season; this season it is forecast at 11.5 million bales, indicating a decline in our export potential. At the same time, the U.S. exportable surplus is estimated to be about 3.5 million bales smaller this season. Consequently, we are forecasting U.S. exports for 1980-81 at 6 million bales, sharply below last season's 9.2 million.

COTTON SUPPLY AND USE: U.S. MAJOR IMPORTERS, MAJOR EXPORTERS AND WORLD; MARKETING YEARS 1978-79
1979-80, AND PROJECTED 1980-81¹

[Million 480-lb bales]

Year/item	World less United States					
	United States	Major importers ²	Major exporters ³	Others	Total	World ⁴
1978-79						
Supply:						
Beginning stocks.....	5.3	7.8	4.8	6.4	19.0	24.3
Production.....	10.9	10.9	22.4	16.0	49.3	60.1
Imports.....	(5)	16.6	.5	2.8	19.9	19.9
Use:						
Mill use.....	6.4	27.8	14.6	14.2	56.6	63.0
Exports.....	6.2	.4	8.9	4.3	13.6	19.8
Ending stocks.....	4.0	7.0	4.1	6.6	17.7	21.7
1979-80						
Supply:						
Beginning stocks.....	4.0	7.0	4.1	6.6	17.7	21.7
Production.....	14.6	10.0	24.2	15.9	50.9	65.6
Imports.....	(5)	19.1	.3	2.8	22.3	22.3
Use:						
Mill use.....	6.5	29.4	14.6	14.9	58.9	65.5
Exports.....	9.2	.3	8.9	4.3	13.5	22.7
Ending stocks.....	3.0	7.3	4.9	6.1	18.3	21.3
1980-81						
Supply:						
Beginning stocks.....	3.0	7.3	4.9	6.1	18.3	21.3
Production.....	11.6	11.1	24.5	16.3	51.9	63.5
Imports.....	.1	17.5	.3	2.7	20.5	20.6
Use:						
Mill use.....	5.9	28.7	15.0	15.0	58.7	64.6
Exports.....	6.0	.3	9.7	4.3	14.4	20.4
Ending stocks.....	2.8	6.9	5.0	5.7	17.6	20.4

¹ Marketing year beginning Aug. 1.² Includes Western Europe, Eastern Europe, Japan, People's Republic of China, Korea, Taiwan, and Hong Kong.³ Includes the U.S.S.R., Pakistan, Egypt, Sudan, Turkey, Central America, and Mexico.⁴ Total trade of individual countries including intraregional trade. World imports and exports may not balance due to cotton in transit and reporting discrepancies in some countries.⁵ Less than 50,000 bales.

Note: Totals may not add and stocks may not balance due to rounding, a small quantity of cotton destroyed, and differences unaccounted. Forecasts are dated Oct. 14, 1980.

As figure 2 indicates, net export sales of U.S. cotton have declined sharply in recent weeks. This decline results from U.S. prices exceeding foreign prices. In September, for example, the price of U.S. cotton (Strict Middling, 1 1/16 in., c.i.f., Northern Europe) averaged \$1.07 a pound, compared to the Outlook "A" price of \$1 a pound.

As of October 30, the U.S. export commitment—exports plus outstanding sales—was around 3.7 million bales, about 2.6 million below a year earlier, and only about 230,000 bales above the commitment on August 1, 1980.

THE DOMESTIC COTTON MARKET

Mill use

Domestic textile mill use of cotton is expected to decline to 5.9 million bales in 1980-81, down 0.5 million from last season. This forecast assumes the domestic economy will experience a slow recovery from the recession. A stronger recovery than currently anticipated could increase mill use to around 6.5 million bales. On the other hand, weaker economic activity could cause mill use to fall to around 5.5 million bales, especially in view of cotton's worsening price competitiveness with polyester staple, and the possibility of a less favorable U.S. trade balance in cotton textile products.

As figure 3 indicates, cotton mill use has declined in recent months, falling to a seasonally adjusted annual rate of only 5.9 million bales in August. Some recovery was noted in September, however, as the annual rate of use rose to 6.3 million bales.

Manmade fiber consumption was more severely affected by the recession than was cotton, figure 3. This reflected the severe downturn in housing construction and in the automobile and other durable goods industries. As a result, cotton had a 26.3-percent share of the fiber market during the first half of 1980, up from 24.1 percent a year earlier.

In September 1980, U.S. mills paid 78 cents a pound for polyester staple, 13 cents above a year earlier; rayon staple was priced at 76 cents a pound, 11 cents above a year earlier. Mill-delivered cotton prices at 95 cents a pound (Strict Low Middling, $1\frac{1}{16}$ in.) were 27 cents higher than in September 1979, figure 4.

While significant price-induced substitutions among fibers are not likely in the short-run, the wide price difference between cotton and polyester will probably cause some shift in blending ratios toward polyester during the coming year.

In 1979, the U.S. trade deficit in cotton textiles fell to the equivalent of 0.56 million (480 pound) bales of raw cotton, a 44-pound improvement over 1978, figure 5. And, during the early months of 1980, cotton textiles left the United States at record rates. In recent months, however, textile imports have surged, due primarily to the release of Chinese-manufactured textiles which, until June, were embargoed in U.S. warehouses. It now appears that the 1980 trade deficit will about match that of 1979.

Production

The USDA forecast U.S. cotton production for 1980-81 at 11.6 million bales, considering conditions as of October 1. The estimated average yield of 419 pounds per harvested acre is the smallest since 1957 and contrasts sharply with 1979's record-high 548 pounds per harvested acre. Hot, dry weather caused large yield reductions in the eastern belt and in Texas and Oklahoma. Harvested cotton acreage was placed at 13.3 million, about 0.5 million above 1979.

The costs of producing cotton continued to increase this year. Upland cotton costs, excluding land, were estimated at \$359 per planted acre, up from \$305 in 1979. Per pound costs increased even more due to the abnormally low average yield of 386 pounds per planted acre. Per pound costs are estimated to be 93 cents a pound. Deducting the value of cottonseed results in an estimated net cost of about 83 cents per pound. In 1979 net costs were 50 cents per pound, compared to a season average price of 62 cents a pound.

Whereas 1979-80 was a relatively profitable year for cotton producers in the aggregate, this season's poor yields will result in many producers failing to cover total costs, figure 6. For example, I estimate that the average renter will have to receive about \$1 per pound of lint to cover total costs; a landowner, 83 cents a pound.

Prices

Upland cotton farm prices jumped to 82 cents a pound in September, 25 cents above a year earlier. At mid-October farm prices were estimated at 76 cents a pound, figure 7. So far this season, farm prices are averaging about 15 cents a pound over the average for 1979-80.

The projected supply/demand conditions suggest that cotton prices will remain strong during 1981. The ratio of cotton disappearance to supply has been a good indicator of changes in annual average spot prices, figure 8. Prices for the 1980-81 season will probably average higher than the projected ratio of use to supply indicates due to the sharp increase in cotton production costs and general inflationary pressures. During August-October, spot prices of SLM $1\frac{1}{16}$ -inch cotton averaged 86 cents a pound, 15 cents higher than the 1979-80 season average.

Average prices in September triggered the special upland cotton import quota provision of the Food and Agriculture Act of 1977. The additional quota of nearly 500,000 bales will be effective for 90 days following its publication in the Federal Register. A smaller quantity of cotton is likely to be imported into the United States under the special quota.

Let's turn our attention now to the outlook for the 1981-82 season.

U.S. OUTLOOK FOR 1981-82

In 1980, 14.4 million acres were planted in cotton, including 79,000 acres of Extra Long Staple cotton. The increase of about 0.5 million acres from 1979 resulted primarily from more favorable cotton prices relative to soybeans. Acreage in the Southeast and Delta regions where soybeans and cotton compete increased from 3.2 million to 3.8 million acres.

Since last spring, prices of soybeans and grain sorghum have increased relative to cotton, and, in absolute terms, cotton costs have increased more. As indicated by figure 9, cotton acreage may decline by a half million or more acres. The largest decline may be in the Southwest region—Texas and Oklahoma.

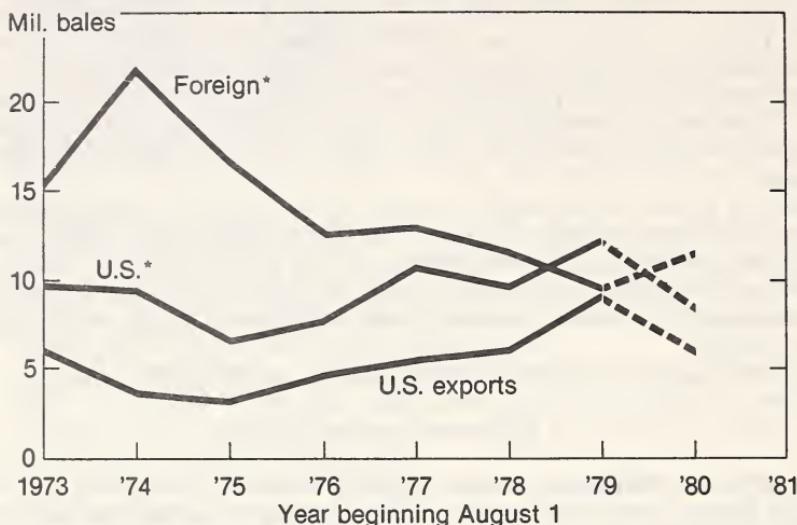
Allowing for price movements between now and planting time, I think that 1981 cotton acreage will be in the range of 13.5 to 14.5 million acres. Current price relationships point to acreage being in the bottom half of that range.

Upland cotton producers will have a loan rate of 52.46 cents a pound for the 1981-82 crop, up from 48 cents for 1980-81. This loan rate is for SLM $1\frac{1}{16}$ -inch cotton at average location. Preliminary calculations indicate a 1981 target price of around 70 cents a pound, up from 58.4 cents in 1980. The actual 1981 target price will be announced at a later date.

U.S. cotton disappearance in 1981-82 is expected to be around 13 million bales, with exports likely accounting for 50 to 55 percent of the total. Exports will be stimulated by the relatively low level of stocks expected in foreign countries next August 1. Domestic mill use depends heavily on economic conditions and relative fiber prices. Accordingly, only a slight increase is foreseen for 1981-82.

These forecasts of cotton acreage and disappearance suggest that "normal" yields (around a bale per acre) in 1981 would result in supplies remaining tight. With normal yields, ending stocks on August 1, 1982 could be only slightly above the 2.8-million-bale level projected for August 1, 1981. Thus, growing conditions in 1981 will probably be the key determinant of the nature of the cotton supply-demand balance for the 1981-82 season.

U.S. Export Potential



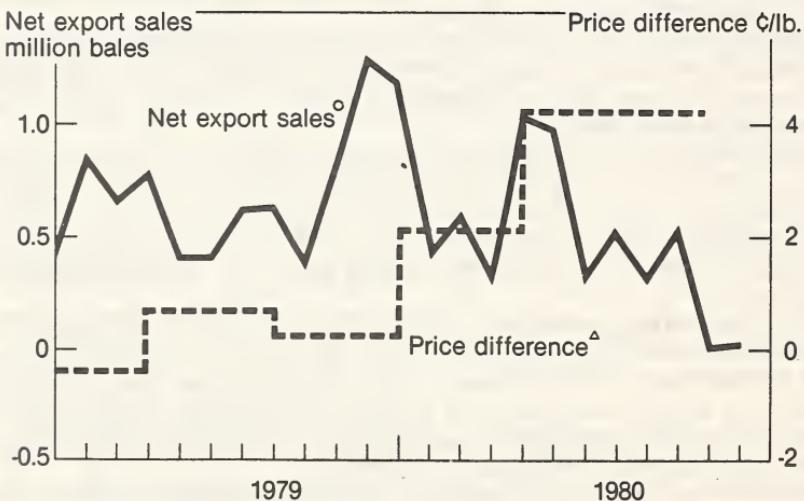
* Beginning stocks and production minus consumption.

USDA

Neg. ESS 264-80 (10)

Figure 1

Net Export Sales*



* 4-week periods. ^oNew sales minus cancellations.

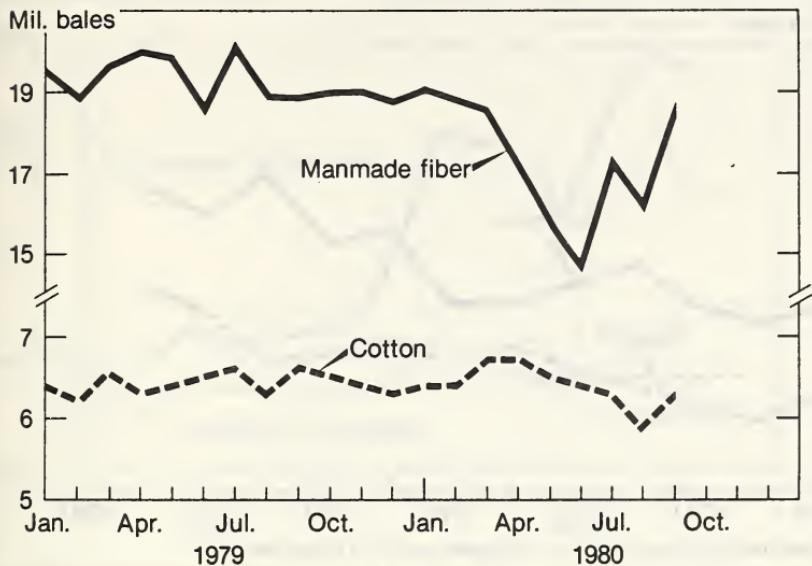
[△]U.S. SM 1-1/16-inch, c.i.f. N. Europe minus outlook "A" index.

USDA

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Figure 2

Seasonally Adjusted Annual Rate of Mill Use

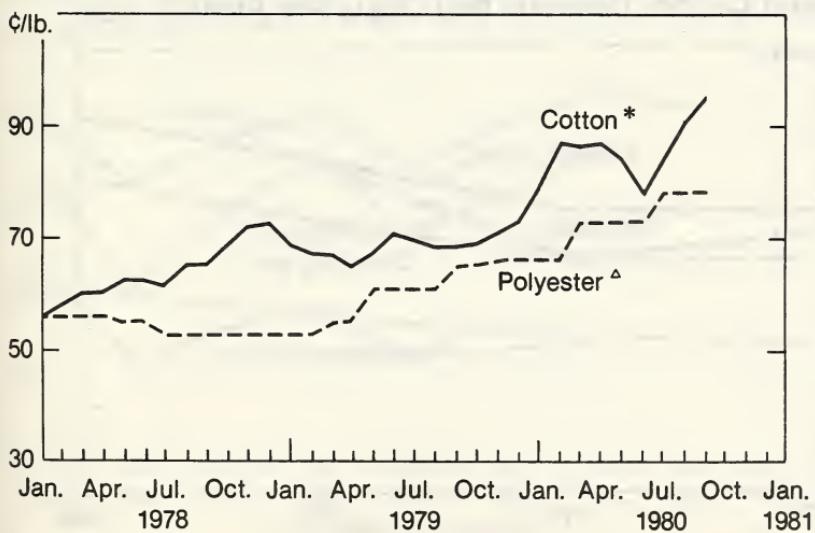


USDA

Figure 3

Neg. ESS 266-80 (10)

Mill Delivered Prices



*SLM 1-1/16 inches Group B mill points.

^Type 54, 1.5 denier.

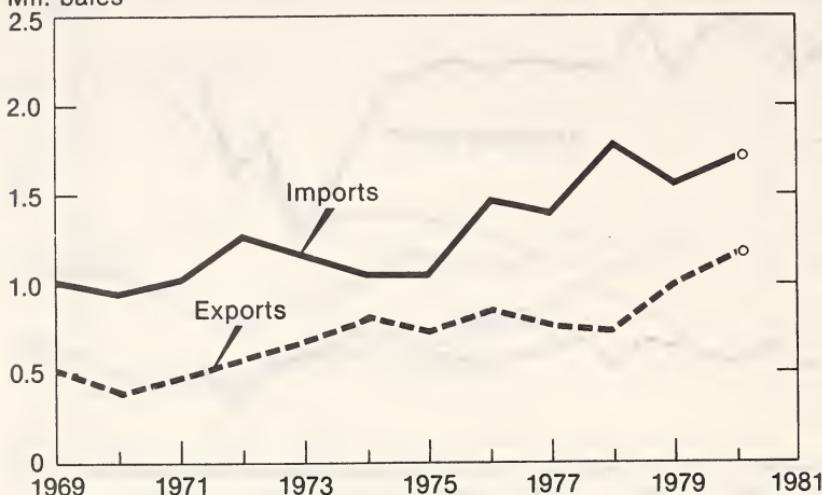
USDA

Neg. ESS 265-80 (10)

Figure 4

Cotton Textile Trade

Mil. bales*



*480-pound raw cotton equivalent bales. °Estimate based on 8 months data.

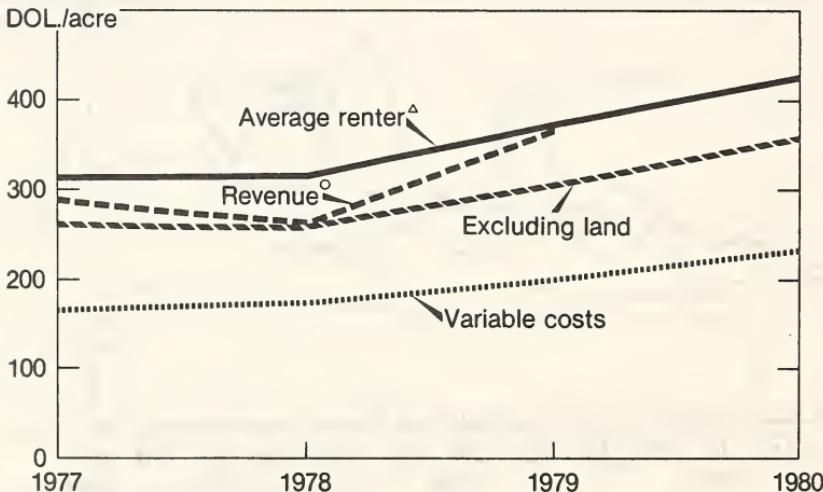
USDA

Neg. ESS 2262-80 (10)

Figure 5

Upland Cotton: Revenue and Costs Per Planted Acre

DOL/acre



○Includes farm value of lint and seed; value for 1980/81 is not shown since price forecast is implied.

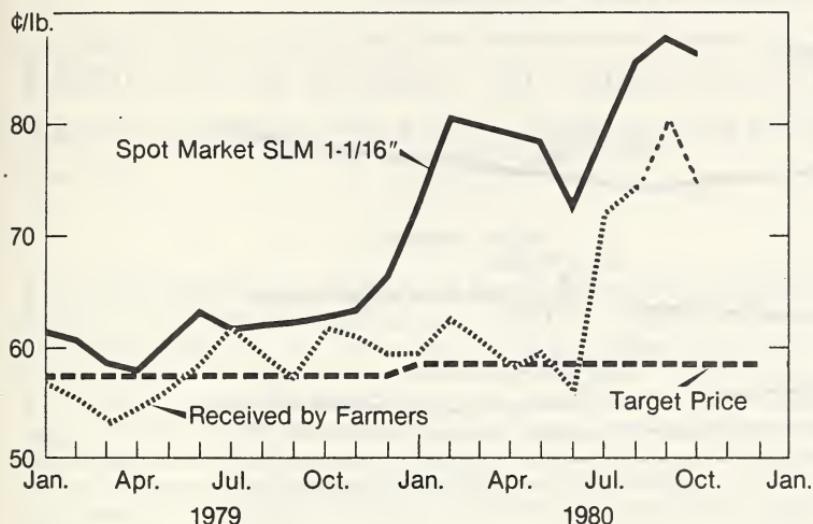
△Based on prevailing tenure arrangements in 1978.

USDA

Neg. ESS 268-80 (10)

Figure 6

U.S. Cotton Prices

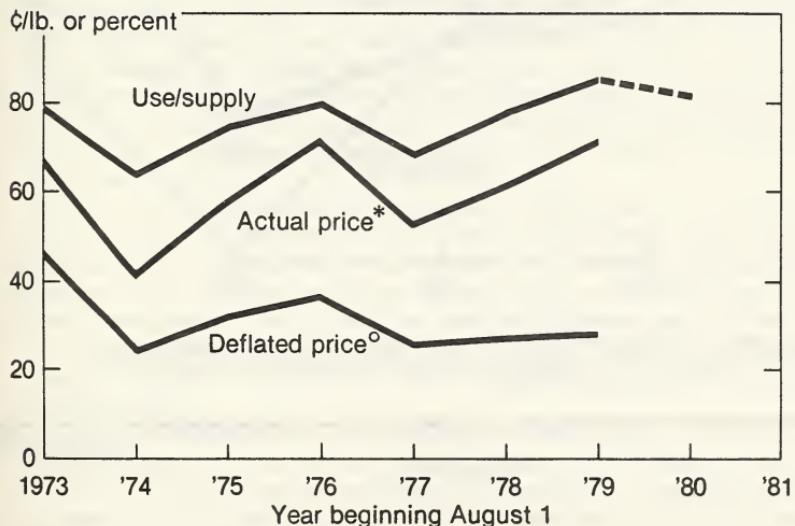


USDA

Neg. ESS 2597-80 (10)

Figure 7

Cotton: Supply, Demand and Price



*Designated spot market, SLM 1-1/16 inches.

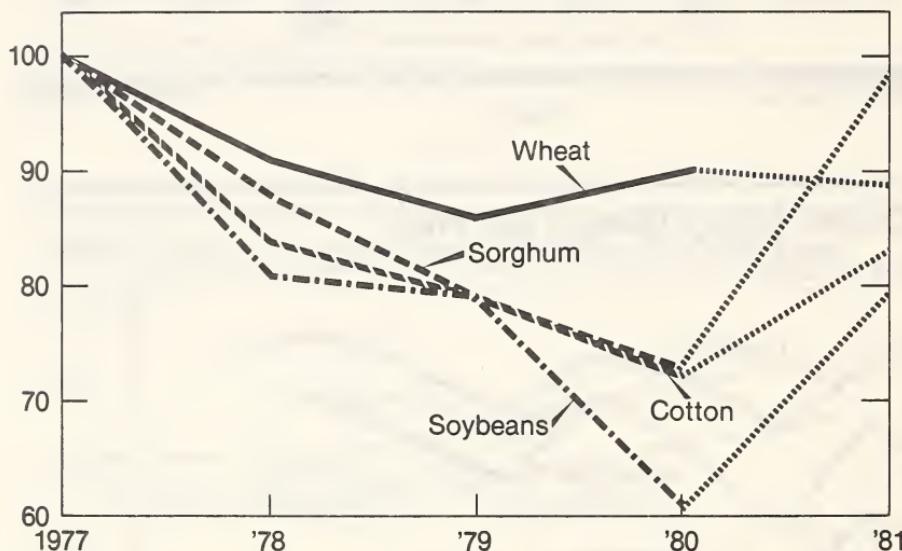
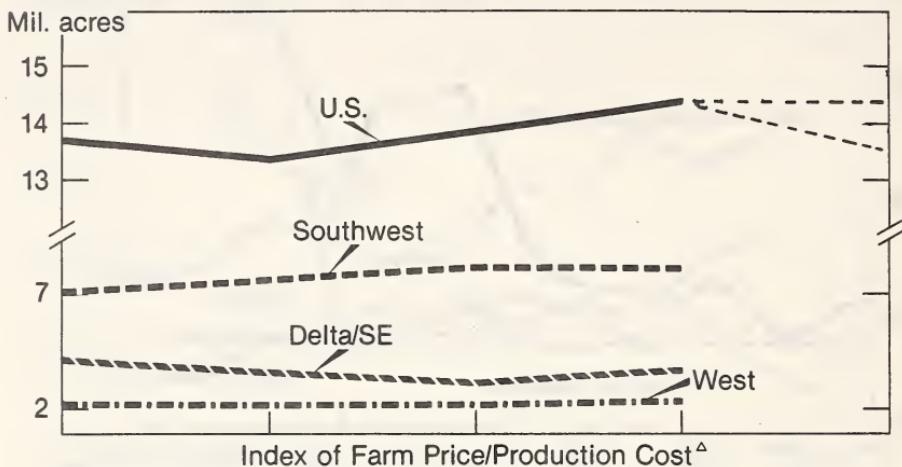
°Designated spot market, SLM 1-1/16 inches divided by producer price index.

USDA

Neg. ESS 267-80 (10)

Figure 8

Upland Cotton Planted Acreage



[△]Farm price as percent of 1977 price divided by production cost (excluding land and management) as percent of 1977 cost; farm prices are lagged one year. 1981 forecast as of November 1, 1980.

WORLD AND U.S. OILSEEDS AND PRODUCTS OUTLOOK

(By Dr. Jim L. Matthews, World Food and Agricultural Outlook and Situation Board, U.S. Department of Agriculture)

INTRODUCTION

A sharp reduction in production for all oilseed crops in the United States and in Canada highlights the 1980-81 oilseeds outlook. Large inventories carried over from last year's big crops and modest production gains elsewhere are cushioning the price impact somewhat. Nevertheless, domestic short crops are leading to a stocks drawdown and substantial price increases for all oilseed crops and their products. Price developments for most oilseeds in 1980-81 depend importantly on the outcome of Southern Hemisphere oilseed crops, being planted now, and the strength of demand for oilseed products in major consuming markets. Policy decisions by some key exporting and importing countries may be quite significant in the 1980-81 outlook, particularly for soybeans and peanuts.

OILSEED CROP PRODUCTION IS DOWN SHARPLY

World crops.—World oilseed output is expected to decline by 10 percent or more this year from the record world production of 176 million metric tons in 1979-80 (table 1). This would exceed the previous largest year-to-year decline recorded in 1976-77 when oilseed crops were down in most major producing areas. This year's drop in world output is concentrated in the United States and Canada where dry weather in the key growing months sharply cut yields and harvested acreage. Oilseed production was off by about a fourth in both countries.

U.S. crop output.—In the United States, where soybeans constitute about 85 percent of all oilseed production, more than a 25-percent drop in production was recorded. Production declines also were substantial for the other major oilseed crops with sunflower seed and peanut production both down by nearly 50 percent and cotton seed by over 20 percent. Quality problems are further limiting the availability of peanuts in the United States for edible grade uses for both domestic and export use.

Rest of world output.—The decline in oilseed output in North America will be partially offset by gains in other producing and exporting countries. In the case of peanuts (groundnuts), production gains in the rest of the world about match the decline in U.S. output, but a higher proportion of these peanuts may be suitable for only crushing. India's peanut crop is anticipated to increase by about 600,000 metric tons in 1980 over the 6 million ton crop in 1979 and offers the best supply potential for edible grade peanuts. The availability of this crop

TABLE 1.—WORLD AND U.S. OILSEED PRODUCTION 1976-77 TO 1980-81
[Production in million metric tons]

	1976-77	1977-78	1978-79	1979-80	1980-81	Standard errors ¹	Trends B's ²
World:							
Soybeans	61.3	72.5	77.8	93.9	81.6	±6.0	3.91
Other oilseeds	68.5	75.5	77.8	81.2	79.6	±2.6	1.26
All	129.8	148.0	155.6	175.1	161.2	±7.8	5.17
Soybeans share (percent)	47	50	50	54	51	—	—
Rest of world:							
Soybeans	26.3	24.6	26.9	32.2	33.3	±2.6	1.77
Other oilseeds	62.3	66.9	69.8	70.1	72.3	±2.1	1.11
Rapeseed	7.4	7.9	10.8	10.3	11.5	—	—
Sunflowerseed	9.6	11.6	11.0	11.8	11.5	—	—
Cottonseed	18.8	19.9	20.0	19.7	20.9	—	—
Peanuts	15.6	15.4	16.5	16.1	16.8	—	—
All oilseeds	88.6	91.5	96.7	102.3	105.6	±3.3	2.88
United States:							
Soybeans	35.0	47.9	50.9	61.7	48.3	±4.50	2.15
Cottonseed	3.7	5.0	3.9	5.2	4.0	±.50	—
Peanuts	1.7	1.7	1.8	1.8	1.1	±.06	—
Sunflowerseed	.5	1.3	1.8	3.5	2.0	±.20	—
Flaxseed	.2	.4	.3	.3	.2	±.14	—
All oilseeds ³	41.3	56.5	58.9	72.8	55.4	±5.60	2.30

¹ Derived from trend fits and applied to forecasts prior to August.

² Fitted for period 1964-65 to 1979-80

³ Includes safflowerseed also.

for export, however, depends heavily on decisions by the Indian State Trading Corp. which controls India's trade in oilseeds and products. Indications are that India may increase their groundnut exports significantly to perhaps 100,000 tons compared to 20,000 tons in 1979-80.

South American soybean crops.—Production gains for oilseed crops in the rest of the world depends most importantly on the South American soybean crops which are being planted at this time. In Argentina, soybean acreage may be up but perhaps by no more than 5 percent. More of the acreage may be double cropped acres with wheat, as wheat acreage is up 8 percent this year. Expanded feed grain acreage because of favorable prices for grains may reduce planting of single crop soybeans. This shift in acreage could keep yields below their longer term trend levels although yields should be up substantially from this past year when drought was a problem. In Brazil, increased price support incentives for wheat and other food crops should limit soybean acreage expansion in the South but modest increases in acreage are anticipated in the newer producing areas.

In the Soviet Union, the sunflowerseed crop was harvested late because wet weather held up the crop harvest and may have prevented the sunflowerseed from maturing properly. Some of this acreage may not be harvested at all. This could result in a crop of around 5 million tons compared to 5.4 million last year.

The 1981 U.S. soybean production outlook.—Looking ahead to 1981, a sharp recovery in U.S. production of soybeans and other oilseeds can be anticipated if yields are more nearly normal. Acreage devoted to soybeans in the United States, however, is not expected to change much from this year's planted area of 70.3 million acres as prices for soybeans relative to other competing crops, particularly corn, are not

all that favorable. The soybean to corn price ratio has been a good guide on year-to-year changes in soybean planted acreage (table 2). A ratio greater than 2.5 has been encouraging for the expansion of soybean acreage. Currently, we anticipate that this ratio will average about 2.5 as both corn and soybean prices are up in response to short crops for both.

TABLE 2.—SOYBEAN TO CORN PRICE RATIOS RELATED TO YEAR-TO-YEAR CHANGES IN U.S.-SOYBEAN PLANTED ACRES

	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
Soybeans:									
Planted acres (million acres).....	56.5	52.5	54.6	50.2	58.8	64.4	71.6	70.3	70.0
Year-to-year change.....	9.6	-4.0	2.1	-4.4	8.6	5.6	7.2	-1.3	-0.3
Index (100 equals no change).....	110	96	102	96	109	106	107	99	100
Soybeans to corn:									
Price ratio (-1).....	2.8	2.3	2.5	2.3	3.3	2.9	3.0	2.5	2.40
Index (2.5 equals 100).....	112	92	100	92	132	116	120	100	96

TIGHTER OILSEED AND PRODUCTS SUPPLY-DEMAND BALANCES WILL BOLSTER PRICES

Larger supplies at beginning of 1980-81.—With world and U.S. oilseed production down about 8 and 24 percent respectively, large carryovers from record U.S. soybean and sunflowerseed crops in 1979-80 and much larger Southern Hemisphere crops are a moderating influence on total world oilseed supplies. Stocks of Canadian rapeseed and flaxseed are up substantially as well. All major producer-exporters' stocks are estimated to be about 10 million metric tons higher than a year earlier, or nearly double (table 3). Consequently, total oilseed supplies are off by only 3 percent with all of the decline concentrated in soybeans.

TABLE 3.—WORLD: SUPPLIES AND USE OF OILSEEDS
[Million metric tons]

	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1970-80 growth rate (percent)
Beginning stocks:							
Soybeans.....	12.1	9.6	10.5	11.1	18.3	13.8	.....
Other oilseeds.....	2.2	1.0	2.0	2.3	4.5	2.0	.....
Total.....	14.3	10.6	12.5	13.4	22.8	15.8	.....
Production:							
Soybeans.....	61.3	72.5	77.8	93.9	81.6	.....	.....
Other oilseeds.....	68.5	75.5	77.8	81.2	79.6	.....	.....
Total.....	129.8	148.0	155.6	175.1	161.2	.....	4.7
Annual change (percent).....	-7.0	+14.0	+5.1	+12.5	-8.1	.....	.....
Total supply:							
Soybeans.....	73.4	82.1	88.3	105.0	99.9	.....	.....
Other oilseeds.....	70.7	76.5	79.8	83.5	84.1	.....	.....
Total.....	144.1	158.6	168.1	188.5	184.0	.....	.....
Annual change (percent).....	-5.3	+10.1	+6.0	+12.1	-2.4	.....	.....
Apparent consumption:							
Soybeans.....	63.8	71.7	77.2	86.7	86.1	.....	.....
Other oilseeds.....	69.7	74.5	77.5	79.0	82.1	.....	.....
Total.....	133.5	146.2	154.7	165.7	168.2	.....	4.5
Ending stock/use ratio (percent).....	7.9	8.5	8.7	13.8	9.4	.....	.....

Product supplies.—Because soybeans have a higher meal yield and a low oil yield compared with other oilseeds, potential world supply of protein meals is expected to decline by 2 to 4 percent while the world supply of vegetable oils and fats may actually expand 1 to 2 percent (table 4).

1980-81 vegetable oil prices.—More plentiful supplies of high oil yielding oilseeds combined with large carry-in inventories of soybean oil (including the oil equivalent of beans) have been instrumental in holding soybean and other fats and oil prices down in the last half of 1980, relative to protein meal and other foods and feedstuffs. Vegetable oil prices are expected to strengthen in 1981 from current levels as stocks are drawn down and year-over-year production gains in palm production slows significantly. For the 1980-81 crop year, current dollar prices for soybean oil could average over \$600 per metric ton, up 12 to 15 percent from 1979/80 average levels. Nevertheless, prices rela-

TABLE 4.—WORLD SUPPLY AND USE: PROTEIN MEALS AND FATS AND OILS

[Million metric tons]

	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
44 percent protein meal:						
Beginning stocks:						
Soybeans.....	9.6	7.5	7.6	7.3	14.0	10.4
Other oilseeds.....	.9	.6	1.0	1.3	1.9	1.4
Total.....	10.5	8.1	8.6	8.6	15.9	11.8
Production:						
Soybeans.....	41.1	50.0	53.6	65.4	56.0	.....
Other oilseeds.....	25.8	28.5	29.7	31.1	30.2	.....
Total.....	66.9	78.5	83.3	96.0	86.2	.....
Total supply:						
Soybeans.....	50.7	57.5	61.2	72.6	70.0	.....
Other oilseeds.....	26.7	29.1	30.7	32.3	32.1	.....
Total.....	77.4	86.6	91.9	104.9	102.1	.....
Apparent use:						
Soybeans.....	43.2	49.9	53.9	58.4	59.6	.....
Other oilseeds.....	26.1	28.1	29.5	30.7	30.8	.....
Total.....	69.3	78.0	83.4	88.7	90.4	.....
Stock/use ratio (percent).....	11.7	11.1	10.4	18.0	13.0	.....
Oil equivalent:						
Beginning stocks:						
Soybeans.....	2.8	2.0	2.2	2.2	3.9	2.9
Other oilseeds and fats.....	1.7	1.7	1.7	1.9	2.8	2.7
Total oils and fats.....	4.5	3.7	3.9	4.1	6.7	5.6
Production:						
Soybeans.....	9.1	11.1	11.9	14.6	12.5	.....
Other oilseeds and fats.....	38.6	41.3	42.6	43.8	43.9	.....
Total oils and fats.....	47.7	52.4	54.5	58.4	56.4	.....
Total supply:						
Soybeans.....	11.9	13.1	14.1	16.8	16.4	.....
Other oilseeds and fats.....	40.3	43.0	44.3	45.7	46.7	.....
Total oils and fats.....	52.2	56.1	58.4	62.5	63.1	.....
Apparent use:						
Soybeans.....	9.9	10.9	12.0	12.9	13.4	.....
Other oilseeds and fats.....	38.6	41.3	42.7	42.9	44.1	.....
Total oils and fats.....	48.5	52.2	54.4	55.8	57.5	.....
Stock/use ratio (percent).....	7.6	7.5	7.5	12.0	9.8	.....

tive to other goods and services should change little on average as stocks of all fats and oils should remain ample compared to earlier years in both the United States and in the rest of the world (table 5).

TABLE 5.—PRICES FOR SOYBEAN OIL, UNITED STATES, DECATUR

	U.S. Decatur	
	Dollar per metric ton	\$75 per metric ton
1970-71	283	376
1971-72	249	320
1972-73	364	441
1973-74	694	758
1974-75	677	677
1975-76	403	380
1976-77	529	469
1977-78	542	447
1978-79	604	448
1979-80	540	353
1980-81	517	367

Protein meal prices.—The likely 3 to 5 percent decline in world oilseed meal supplies in 1980-81 combined with a continuing strong demand for protein meal in livestock rations, is instrumental in the continuing strength observed in soybean meal prices as well as for other oilseed meals. After the sharp decline in U.S. soybean meal prices in the April-June quarter of 1980, meal prices have rallied to around \$275 per metric in in recent weeks (table 6). Meal prices could begin to meet some resistance by buyers at these levels as profit margins from livestock feeding are squeezed in the United States plus a number of other major consuming countries.

TABLE 6.—QUARTERLY PRICE FOR SOYBEAN MEAL

	I	II	III	IV
1978-79	200	209	216	213
1979-80	203	191	179	220
1980-81 (forecast)	270	285	275	270

Oilseed prices.—With oilseed demand expected to increase again in 1980-81, prices for soybeans and other oilseeds are expected to be up substantially. Soybeans are forecast to average around \$2.25 per bushel above the \$6.25 per bushel price received by U.S. producers in 1979-80 with prices expected to continue higher into the spring of 1981. Higher soybean prices are associated with the estimated domestic stock carryover of 180 million bushels or around 9 percent of recent usage levels. Such stock levels constitute only around 1 month's usage and are regarded as near minimum commercial needs. Based on previous relationships between prices and stock usage ratios, stocks below these levels would be associated with much higher prices in order to ration usage. The estimated season average price of \$8.50 per bushel is still well below the 1973-74 highs when expressed in 1978-79 constant dollars (table 7).

TABLE 7.—U.S. SOYBEAN PRICES: CURRENT DOLLARS VERSUS DEFLATED DOLLARS PER BUSHEL
[Dollars per bushel]

	1969- 70	1970- 71	1971- 72	1972- 73	1973- 74	1974- 75	1975- 76	1976- 77	1977- 78	1978- 79	1979- 80	1980- 81 ¹
Current dollars.....	2.35	2.85	3.03	4.37	5.68	6.64	4.92	6.81	5.88	6.66	6.25	8.60
1978-79 constant dollars.....	4.42	5.23	5.38	7.29	8.46	8.03	5.27	7.12	6.01	6.66	5.65	6.55

¹ Forecast

SOYBEAN UTILIZATION PROSPECTS WEAKER ON BALANCE

U.S. soybean usage.—Sharply reduced supplies of soybeans and higher prices in the United States are major factors underlying a decline in domestic crush and exports of soybeans (table 8). But, weaker demand for protein meal in the United States and in some other developed market economies in 1980-81 and increased supplies of competitive oilseed meals abroad also are contributing to reduced U.S. utilization of soybean and products.

TABLE 8a.—UNITED STATES: SUPPLIES AND USE OF OILSEEDS
[Million metric tons]

	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
Beginning stocks:						
Soybeans.....	6.7	2.8	4.4	4.7	9.8	4.9
Other oilseeds.....	.8	.6	1.2	1.0	2.4	.8
Total.....	7.5	3.4	5.6	5.7	12.2	5.7
Production:						
Soybeans.....	35.0	47.9	50.9	61.7	48.3	.....
Other oilseeds.....	6.2	8.6	8.0	11.1	7.3	.....
Total.....	41.2	56.5	58.9	72.8	55.6	.....
Annual change (percent).....	-14.0	37.1	4.2	18.0	-24.0	.....
Total supply:						
Soybeans.....	41.7	50.7	55.3	66.4	58.1	.....
Other oilseeds.....	7.0	9.2	9.2	12.1	9.7	.....
Total.....	48.7	59.9	64.5	78.5	67.8	.....
Annual change (percent).....	-10.0	23.0	7.7	21.7	-13.9	.....
Domestic use:						
Soybeans.....	23.6	27.3	30.4	32.9	30.7	.....
Other oilseeds.....	5.6	6.5	6.3	7.1	6.7	.....
Total.....	29.2	33.8	36.7	40.0	37.4	.....
Exports:						
Soybeans.....	15.4	19.1	20.1	23.8	22.4	.....
Other oilseeds.....	.7	1.5	2.0	2.4	2.3	.....
Total.....	16.1	20.6	22.1	26.2	24.7	.....
Ending stocks/use ratio (percent):						
Soybeans.....	7.2	9.5	9.4	17.2	9.2	.....
Other oilseeds.....	9.5	15.0	12.0	25.2	8.9	.....
All oilseeds.....	7.5	10.3	9.7	18.4	9.1	.....
Producer prices (dollars per metric ton):						
Soybeans.....	250	216	245	230	315	.....
Peanuts.....	441	463	465	455	600	.....
Sunflowerseed.....	243	224	237	195	260	.....

TABLE 8b.—SOYBEANS AND PRODUCTS: SUPPLY-DISPOSITION, 1972-78 CROP YEARS, ESTIMATED 1979-80 AND PROJECTED 1980-81

Item	1973-74 1974-75 1975-76 1976-77 1977-78 1978-79 1979-80								Projected 1980-81	
	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80			
SOYBEANS										
Acreage (million acres):										
Planted	56.5	52.5	54.6	50.2	58.8	64.4	71.6	70.3		
Harvested	55.7	51.3	53.6	49.4	57.6	63.3	70.5	66.9		
Yield/harvested acres (bushels)	27.8	23.7	28.9	26.1	30.6	29.5	32.2	26.5		
Supply (million bushels):										
Beginning stocks, Sept. 1	60	171	188	245	103	161	174	359		
Production	1,547	1,216	1,547	1,288	1,762	1,870	2,268	1,775		
Total supply	1,607	1,387	1,735	1,533	1,865	2,031	2,442	2,134		
Disposition (million bushels):										
Crush	821	701	865	790	927	1,018	1,123	1,040		
Seed, feed and residual	76	77	70	76	77	100	85	89		
Exports	539	421	555	564	700	739	875	825		
Total disposition	1,436	1,199	1,490	1,430	1,704	1,857	2,083	1,954		
Carryover, Aug. 31, commercial	170	188	245	99	143	161	317	165		
CCC-owned and under loan	1	—	—	4	18	13	42	15		
Total	171	188	245	103	161	174	359	180		
Loan rate (dollars/bushel)	2.25	2.25	—	2.50	3.50	4.50	4.50	5.02		
Season average price (dollars/bushel)	5.68	6.64	4.92	6.81	5.88	6.66	6.25	8.60		
Farm value of products (millions of dollars)	8,787	8,070	7,618	8,769	10,352	12,459	14,175	15,265		
Soybean oil (millions of pounds):										
Beginning stocks, Oct. 1	516	794	561	1,251	771	729	776	1,200		
Production	8,995	7,376	9,630	8,578	10,288	11,323	12,105	11,232		
Total supply	9,511	8,170	10,191	9,829	11,059	12,052	12,881	12,432		
Domestic disappearance	7,282	6,581	7,964	7,511	8,273	8,942	8,991	9,150		
Exports	1,435	1,028	976	1,547	2,057	2,334	2,690	2,400		
Ending stocks, Sept. 30	794	561	1,251	771	729	776	1,200	882		
Soybean meal (thousand short tons):										
Beginning stocks, Oct. 1	183	507	358	355	228	243	267	225		
Production	19,674	16,702	20,754	18,488	22,371	24,354	127,104	24,805		
Total supply	19,857	17,209	21,112	18,843	22,599	24,597	27,371	25,030		
Domestic disappearance	13,802	12,552	15,612	14,056	16,276	17,720	19,238	18,200		
Exports	5,548	4,299	5,145	4,559	6,080	6,610	7,908	6,580		
Ending stocks, Sept. 30	507	358	355	228	243	267	225	250		
Average oil price (cents per pound)	31.5	30.7	18.3	24.0	24.6	27.4	24.3	28.0		
Average meal price (dollars per ton)	146.35	130.90	147.80	199.80	164.20	190.10	181.90	250.00		

¹ Interagency Commodity Estimates Committee for soybeans, flaxseed, cottonseed and oils.

U.S. crush of soybeans in 1980-81 is expected to drop to below 1,050 million bushels, down from the record crush of 1,123 million bushels in 1979-80 as both domestic meal use and meal exports decline. Soybean exports could drop to around 825 million bushels as supplies of soybeans and other oilseeds in other major producer-exporter countries are up by 5 percent while demand growth for all oilseed meals has slowed following strong usage gains in the past 3 years (table 9). Soybean meal usage outside the United States expanded by over 10 percent this past crop year, continuing a strong pattern of annual gains since the recession in the mid-1970's, and particularly since 1977-78 (table 10). A substantial drop in the value of the dollar in 1977-78 sharply reduced prices for protein meal in such important markets as West Europe and Japan and sparked strong gains in soybean meal usage. However, the value of the dollar is not expected to be a significant factor in the 1980-81 marketing year.

TABLE 9.—WORLD LESS UNITED STATES: SUPPLIES AND USE OF OILSEEDS
[Million metric tons]

	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1970-80 growth rate
Beginning stocks:							
Soybeans-----	5.4	6.8	6.1	6.3	8.5	8.9	-----
Other oilseeds-----	1.4	.4	.8	1.3	2.1	1.6	-----
Total-----	6.8	7.2	6.8	7.5	10.6	10.5	-----
Production:							
Soybeans-----	26.3	24.6	26.9	32.3	33.3	-----	-----
Other oilseeds-----	62.3	66.9	69.8	70.1	72.3	-----	-----
Total-----	88.6	91.5	96.7	102.3	105.6	-----	4.3
Annual change (percent)-----	-3.3	+3.2	+5.7	+5.8	+3.2	-----	-----
Total domestic supply:							
Soybeans-----	31.7	31.4	33.0	38.5	41.8	-----	-----
Other oilseeds-----	63.7	67.3	70.6	71.4	74.4	-----	-----
Total-----	95.4	98.7	103.7	109.9	116.2	-----	-----
Annual change (percent)-----	-2.6	+3.5	+5.1	+6.0	+5.7	-----	-----
Apparent use:							
Soybeans-----	40.2	44.4	46.8	53.9	55.4	-----	-----
Other oilseeds-----	64.1	68.0	70.8	71.2	75.0	-----	-----
Total-----	104.3	112.4	117.6	125.1	130.4	-----	4.7
Annual change (percent)-----	-2.5	+7.8	+4.6	+6.4	+4.2	-----	-----

TABLE 10.—WORLD LESS U.S. CONSUMPTION OF SOYBEAN MEAL

	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
EEC-----	10.9	13.8	14.3	15.2	15.2	-----
Japan-----	2.5	2.8	2.9	3.0	3.0	-----
Spain-----	1.9	2.1	2.2	2.3	2.4	-----
U.S.S.R.-----	1.5	1.0	1.2	1.8	2.5	-----
Brazil-----	1.2	1.5	1.8	2.3	2.7	-----
Eastern Europe-----	3.5	3.9	4.4	4.8	4.5	-----
Others-----	9.9	10.3	11.6	13.0	13.6	-----
Total-----	31.5	35.4	38.4	42.4	43.9	-----

U.S. demand for soybean meal.—A sharp decline in usage and demand for protein meal is occurring in the United States this year. Soybean meal usage is expected to drop by about 5 to 7 percent. A reduction in high protein animal units of 2 to 4 percent is anticipated with pork production likely to be down by 7 to 9 percent for the October-September period and poultry may show little change. Pork production utilizes about one-third of all protein meal fed in the United States while poultry accounts for nearly 40 percent of protein meal usage. Consequently, meal usage changes follow very closely those in broiler and pork output. With pork and broiler output likely to show the sharpest year-to-year declines in the first half of 1981, down about 5 percent, we anticipate that meal usage will drop sharply as well during that period (table 11). A steeper decline in meal usage than for livestock output is expected, based on slowing of feed fed per animal unit. Higher meal prices relative to pork and broiler prices have generally been a good indicator of the rate of feeding per animal (table 12). With meal-to-pork price ratios averaging

around 10 percent higher in the first half of the 1980-81 crop year, livestock producers are expected to opt for a little less protein for their feeding rations which should slow meal disappearance with declines of 6 to 10 percent quite likely in the first two calendar quarters of 1981.

TABLE 11.—U.S. SOYBEAN MEAL USE BY QUARTERS

[Million metric tons]

	I	II	III	IV
1977-78	4.1	3.7	3.5	3.4
1978-79	4.4	3.7	4.1	3.8
1979-80	4.9	4.3	4.0	4.2
1980-81 ¹	4.9	4.0	3.6	4.0

¹ Forecast.

TABLE 12.—UNITED STATES: MEAL USE RELATIVE TO LIVESTOCK OUTPUT VERSUS MEAL TO PORK PRICE RATIO

[1967 = 1.000]

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Meal use/pork plus broiler output	1.00	1.03	0.98	1.07	1.10	1.25	1.09	1.23	1.21	1.19	1.15
Meal/pork price ratio	1.00	.65	1.08	.81	.50	.65	.92	.65	.81	.92	.96

U.S. soybean and soybean meal exports.—U.S. exports of soybean and soybean meal on a 44-percent meal-equivalent basis could drop by 2 million metric tons in 1980-81 or close to 9 percent. Soybean meal is likely to be off the most, down perhaps 15 percent from the 7.1 million metric tons in 1979-80 while soybean exports may decline by only 5 to 7 percent in 1980-81 from the record level in 1979-80 of 23.8 million tons (875 million bushels). Consequently the relative importance of the United States in world soybean and meal trade will drop in 1980-81 as soybean supplies available for export in Brazil and Argentina are up (table 13).

TABLE 13.—WORLD AND U.S. TRADE IN SOYBEANS AND SOYBEAN MEAL (44 PERCENT PROTEIN MEAL EQUIVALENT)

[Million metric tons]

	1978-79	1979-80	1980-81
Exporters:			
United States	22.1	26.1	23.8
Brazil	6.2	6.4	8.3
Argentina	2.2	2.1	2.7
Other	1.1	1.1	1.3
Total	31.6	35.7	36.1
Importers:			
EC-9	14.3	15.2	15.4
Spain	2.1	2.3	2.4
Eastern Europe (EE)	4.1	4.3	4.0
Japan	3.6	3.6	3.7
U.S.S.R.	1.5	1.3	2.2
Other	6.0	9.3	8.4
Total	31.6	35.7	36.1

Weaker demand in some key importing countries, short U.S. supplies and increased export availabilities of soybeans from Brazil and

Argentina are significant factors underlying reduced U.S. exports. Continuing strong growth for protein meal in some key markets such as the U.S.S.R. and Mexico are expected to partly offset slower demand growth in other markets.

Southern Hemisphere soybean and meal exports.—Exports of soybeans and soybean meal from Brazil, Argentina, and Paraguay combined could be up by about 2 million metric tons on a soybean equivalent basis in the 1980-81 U.S. crop year beginning October 1. If so, it would be the first time in about 3 years that a significant year-to-year increase in exportable soybean and soybean meal supplies has occurred (table 14).

TABLE 14.—SOYBEAN AND SOYBEAN MEAL EXPORTS FROM SOUTH AMERICAN PRODUCERS

	BRAZIL			ARGENTINA			SOUTH AMERICA		
	1978-79	1979-80	1980-81	1978-79	1979-80	1980-81	1978-79	1979-80	1980-81
October-March:									
Total soybean exports	32	1	298	122	149	250	196	207	624
Total soybean meal exports	1,886	1,430	2,770	232	73	125	2,118	1,503	2,895
Total soybean equivalent	2,462	1,849	3,868	421	243	413	2,118	2,149	4,367
April-September:									
Total soybean exports	606	1,211	1,202	2,681	2,250	2,700	3,577	3,825	4,276
Total soybean meal exports	3,561	3,994	4,320	146	135	165	3,707	4,664	4,495
Total soybean equivalent	5,195	6,358	6,862	2,869	2,424	2,916	8,354	9,146	10,152
October-September:									
Total soybean exports	638	1,212	1,500	2,803	2,408	2,940	3,773	4,041	4,900
Total soybean meal exports	5,447	5,424	7,100	370	255	290	5,817	5,679	7,390
Total soybean equivalent	7,657	8,207	10,730	3,284	2,736	3,314	11,279	11,352	14,624

Note: Extraction rate for Brazil: 1978-79, 0.776 for meal; 1979-80, 0.774 for meal; 1980-81, 0.765 for meal.

A near 5-million-metric-ton increase in the 1980 Brazilian soybean crop is the principal reason for expecting higher exports from Southern Hemisphere origins. However, continued sharp gains in domestic Brazilian soybean meal and oil consumption are limiting export availabilities (table 15). Also, exports are closely regulated by the Brazilian Government. Brazil instituted a program this past fall tying export movement for meal and oil to domestic sales targets which had the effect of slowing Brazilian exports in the late months of the U.S. marketing year. This accounted for some of the stronger than anticipated U.S. export movement in the last half of the 1979-80 U.S. soybean crop year when U.S. soybean exports exceeded year earlier levels by about 30 percent. Exports from Argentina and Paraguay should be up only slightly in the October-to-March period.

TABLE 15.—FEED USE OF SOYBEAN MEAL IN BRAZIL AND LIVESTOCK OUTPUT

[Million tons]

	Beef	Pork	Broilers	Feed use of soybean meal
1970-71	1.8	0.6	0.2	0.1
1971-72	1.8	.6	.2	.2
1972-73	2.0	.6	.3	.1
1973-74	2.4	.7	.4	.7
1974-75	2.1	.7	.4	.9
1975-76	2.2	.8	.5	.8
1976-77	2.2	.8	.5	1.1
1977-78	2.4	.8	.6	1.4
1978-79	2.2	.8	.8	1.6
1979-80	2.1	.9	1.0	2.0
1980-81	2.1	1.0	1.2	2.5

Brazil is expected to continue to liberalize the current restrictions on oilseed and product exports as their trade deficits are growing and foreign exchange reserves are down sharply from a year earlier mainly because of oil import outlays. However, inflation has soared to a 100 percent annual rate in recent months and will continue to be a factor effecting Brazilian export policy. Consequently, uncertainty on Brazilian supply availability will continue for a while. Our present assessment is that Brazil will export substantial amounts with combined bean and meal movement estimated at 1.4 to 1.6 million tons above year earlier levels during the October 1980 to March 1981 period.

Soybean meal use in EC-9.—The European Economic Community (EC-9) is the largest protein meal consuming market using about 28 million metric tons of protein meals in 1979-80, compared to about 20 million metric tons fed in the United States. Livestock feeders there are particularly sensitive to development in market prices for feed-stuffs and, with higher protein prices this year, could cut usage significantly.

Relatively cheaper protein meal prices, compared to feed grains, has been a significant factor in the larger proportionate use of protein feeds in the community's livestock feeding rations in the past. During the past 3 years, a cheaper dollar relative to most European currencies along with abundant U.S. supplies of soybeans and other oilseeds has kept protein prices low relative to internal oilseeds and grain prices. The response in the community to lower relative prices for meal was particularly noticeable in 1977-78 when the community's consumption of protein meal jumped by over 25 percent with only about a 5-percent increase in livestock production. Much of this increase is attributed to a more substantial use of protein meal per unit of livestock production encouraged by an over 20 percent drop in meal prices relative to grains (table 16).

TABLE 16.—MEAL USE TO LIVESTOCK OUTPUT RATIO VERSUS MEAL TO PORK PRICE RATIO

	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Output ratio: Meat to pork and broilers-----	0.87	0.80	0.96	0.99	1.08	1.04	1.25	1.26	1.29	1.22
Price ratio: Meal to corn-----	1.01	2.75	1.23	.96	1.17	1.23	.94	.92	.91	1.11

With relative prices for protein meal expected to rise by more than 20 percent in 1980-81, there is a strong chance that protein use may drop below year earlier levels as producers adjust their feeding mixes to include less protein based feeds. The expected slowdown in protein meal feeding will be moderated some as supplies of manioc—a lower cost energy feed—is expected to be up by 10 percent or more in 1980-81. This may hold protein meal consumption in 1980-81 to little or no gain in the community but further price increases for protein meal could bring about an actual year-to-year decline in internal usage. The uncertainty in EC internal protein meal usage in 1980-81 could swing U.S. soybean export estimates by one-half to 1 million metric tons depending on the extent of internal adjustment by the EC.

Protein requirements in Far East markets.—Sharply reduced livestock-feeding margins in Japan, Taiwan, and South Korea are ex-

pected to continue to hold down growth in feed use including protein feeds. Our present assessment is for only a slight rise in imports of soybeans and meal in 1980-81.

Protein meal use; centrally planned economies.—Centrally planned economies have been good growth markets for protein feed and the prospects are that 1980-81 will be another good year. However, growth this year is expected for only the Soviet Union as larger oilseed crops in East European countries and in the PRC, along with external financial considerations, may result in some small decline in soybean and soybean meal imports for 1980-81.

In the Soviet Union, the efforts to upgrade protein deficit feeding rations is expected to continue even though internal livestock production is down in 1981, partly as a result of reduced supplies of grains for feeding. Slightly lower production of major oilseed crops in the Soviet Union will also be instrumental in increasing Soviet import requirements for meal (table 17). Overall, the Soviets could increase soybean and soybean meal imports by 0.5 to 1 million metric tons in 1980-81. Argentina and Brazil would be large prospective suppliers to the Soviets with significant quantities of meal probably available from West European sources if normal trade relations are not resumed with the U.S. Government.

TABLE 17.—SOVIET UNION: OILSEED AND OILSEED MEAL PRODUCTION AND APPARENT USE
[Million metric tons]

	1971	1975	1978	1979	1980	1981
Oilseed production:						
Soybeans	0.6	0.4	0.5	0.6	0.4	0.5
Sunflower	6.1	6.8	5.9	5.3	5.4	5.0
Cottonseed	4.3	4.5	4.7	4.8	5.2	5.4
Other	.5	.3	.3	.3	.3	.3
Total	11.5	12.0	11.4	11.0	11.3	11.2
Oilseed meal production ¹	4.6	4.9	4.6	4.5	4.5	4.6
Oilseed meal imports:²						
Soybeans		.3	.7	1.4	1.3	2.1
Others	.1	.1	.2	.2	.2	.2
Total	.1	.4	.9	1.6	1.5	2.3
Apparent use meal	4.7	5.3	5.5	5.8	6.2	6.8

¹ Excludes meal from soybean imports.

² Includes 44 percent soybean meal equivalent of soybean imports.

Mexico soybean and meal imports.—Imports of soybeans and soybean meal by Mexico nearly doubled in 1979-80, rising to over 1 million metric tons on a meal equivalent basis. Some acceleration in domestic broiler and pork production in the last year or so is contributing to an increase in internal soybean meal usage and the need for some additional imports. However, a poor soybean crop in Mexico in the fall of 1980 is a big factor in recent strong import growth.

For all of 1980-81, Mexico's soybean imports may rise by 200 to 400 thousand tons. But, meal imports could decline from last year's levels when transportation bottlenecks encouraged Mexico to buy some soybean meal to compensate for reduced crush. On balance, Mexico could import a net of 200 to 300 thousand tons more soybeans and meal on a meal equivalent basis.

AMPLE WORLD SUPPLIES OF EDIBLE OILS AND FATS IN 1980-81

World oil and fats supplies and usage.—Record large carryover supplies from 1979-80 are pushing 1980-81 supplies up slightly in spite of the sharply reduced North American oil bearing crops. Prices for most of these fats and oils should continue to lag general price increases and thereby encourage some further expansion in usage in most countries. Weak economic growth in most developed countries is slowing 1980-81 demand expansion somewhat. In the developing market economies, consumption growth should continue near year earlier rates for many of these countries, but increased domestic availabilities of oils and fats in a number of importing and exporting developing countries may slow trade with developed country exporters like the United States. In the centrally planned economies, internal supply growth in oil and fat production is expected to continue flat with some increase recorded by Mainland China (PRC) while the U.S.S.R.'s internal oil production could be down depending on the outcome of this year's sunflowerseed crop.

World less U.S. oil and fat supply/demand balances.—Food usage of all fats and oils outside the United States is expected to expand close to the past 10-year growth rate of 3.7 percent and about in line with the growth registered in 1979-80. However, with total production plus stocks up by about 5 percent, net import requirements are down (table 18).

U.S. soybean oil export prospects.—Exports of U.S. soybean oil as oil are expected to drop by 100 to 200 thousand metric tons (200 to 400 million pounds) in 1980-81 from the 1.3 million metric tons (2.7 bil-

TABLE 18.—WORLD LESS UNITED STATES: EDIBLE VEGETABLE OILS AND FATS SUPPLY AND USE

[Million metric tons]

	1970-71	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
World less United States:¹							
Beginning stocks	0.5	2.1	2.2	2.3	2.2	2.3	3.6
Production	31.6	37.2	36.5	38.5	40.0	41.1	42.3
Imports	4.6	5.1	5.9	7.1	7.3	8.4	8.3
Total supply	36.7	44.4	44.7	47.9	49.6	51.8	54.2
Apparent use (3.2) ²	35.3	41.1	41.5	45.0	46.6	47.4	49.7
India:							
Production	3.2	3.5	2.9	3.3	3.5	3.2	3.5
Imports	.3	.3	1.2	1.4	1.2	1.4	1.4
Apparent use	3.5	3.6	4.1	4.6	4.7	4.6	4.8
Peninsula Malaysia:							
Beginning stocks	.4	.15	.13	.17	.21	.39	.44
Production	.6	1.3	1.5	1.6	2.0	2.5	2.7
Exports	.5	1.2	1.3	1.4	1.7	2.2	2.4
U.S.S.R.:							
Production	5.3	5.2	5.3	5.6	5.3	5.2	5.2
Net imports	-.5	.2	.2	.3	.8	.8	1.1
Apparent availability	4.9	5.3	5.5	5.9	6.1	6.0	6.3
Brazil and Argentina:³							
Beginning stocks		.16	.12	.18	.28	.30	.43
Production	.3	1.3	1.5	1.9	1.9	2.1	2.5
Exports		.5	.5	.7	.6	.6	.9
Consumption	.3	.8	1.0	1.1	1.3	1.4	1.6

¹ World less United States includes oil equivalent of oilseeds.² Annual percentage growth rate 1969-70 to 1979-80 shown in parenthesis.³ Soybean oil as oil only.

lion pounds) exported in 1979-80. Beside the overall buildup in oil supplies outside the United States which will limit export prospects, key importing countries in 1979-80 are not as much in need of vegetable oil including soybean oil this year. India in particular is likely to cut imports and, with larger soybean supplies available in Brazil and increased supplies of palm oil in Malaysia, the United States will find it quite difficult to avoid some decline in soy oil exports (table 19).

TABLE 19.—U.S. SOYBEAN OIL EXPORTS BY DESTINATION

	1979-80	1980-81
All destinations	1,324	1,090
India	424	300
Pakistan	173	200
Brazil	111	-----
People's Republic of China	92	100

Import markets which could expand in 1980-81.—A principal market for imported oils and fats in recent years has been the Soviet Union. A general stagnation in internal Soviet production in recent years has led to increased dependence on imported fats and oils. In 1980-81, Soviet imports of fats and oils may need to increase by 200 to 400 thousand tons including the oil equivalent of imported soybeans. Much depends on Soviet sunflowerseed production, estimated at around 5 million tons, down from 5.4 million tons in 1979. Increased Soviet imports of vegetable oils could come from both Malaysian palm oil and from Brazil where exportable supplies of soybean oil are up by around 200,000 tons over a year ago.

U.S. domestic use of oils and fats.—Edible use of all fats and oils was up by only 2 percent in 1979-80 following strong annual average gains of 6 percent in the previous 2-year period. A drop in real economic activity in 1980 and reduced consumer expenditures was believed to have contributed to the very slow growth in 1979-80. This pattern of slowing growth is not expected to change much in 1980-81 with all fats and usage likely to increase again by around 2 percent.

For soybean oil, year-over-year gains in usage should be higher than for all oils and fats as animal fat supplies should be down 4 to 5 percent in 1980-81. A gain of 3 percent or more could occur if supplies of imported oils such as palm do not pick up significantly. Palm imports could be up noticeably in 1980-81 particularly if present low prices for palm oil continue to persist. Palm oil, which sold at a substantial premium over soybean oil during 1979-80 and for the first half of 1980, has been quoted in recent months at a discount to soybean oil. Imports have been quite responsive in the past when such price discounts occurred and may be again if increased palm supplies are not moved to other importing markets.

EDIBLE PEANUTS FOR DOMESTIC USE AND EXPORT DOWN IN 1980-81

Production of edible grade peanuts are down by about 50 percent this crop year with about a 40-percent decline in the crop and with an additional 15 percent of the crop afflicted with *aspergillus flavus* mold. The decline in peanut supplies is likely to cause some serious

disruptions in the marketing of edible grade peanuts this year, but the impact of the shortages may be less than suggested by the overall shortfall in the crop, as edible supplies historically are typically well in excess of amounts used for food purposes. Some tightness may occur for the crushing grade peanuts but the situation is far less of a concern than for edible peanuts.

Supply/use balances for peanut by use category.—Supplies of edible grade peanuts for 1980-81 are estimated at about 2.5 billion pounds, down from 4.4 billion pounds in 1979-80. While the decline is steep it is not expected to result in nearly the same proportionate decline in peanuts for domestic food uses or for export edible needs. If 1979-80 is used as a near normal year, the edible food use of peanuts in 1980-81 would have been around 2 to 2.1 billion pounds while edible grade peanuts for exports would have been between 0.8 and 0.9 billion pounds. Thus, essential edible usage ranges between 2.8 and 3 billion pounds or about 1 billion pounds below a more normal production outturn (table 20). More importantly, with edible grade supplies estimated at around 2.5 billion pounds, the apparent decline in essential edible usage in all outlets may be down about 20 percent. Still, this is quite a significant drop and prices have risen sharply. Prices for edible grade peanuts have been quoted substantially above this year's quota loan of \$455 per ton though many growers who sold or contracted their peanuts early may not benefit from the recent price rises.

SUNFLOWERSEED PRODUCTION SHOULD REBOUND FROM THE 1980-81 SETBACK

The rapid expansion in sunflowerseed acreage and production in the United States over the past 3-year period was interrupted in 1980

TABLE 20.—PEANUTS: UNITED STATES SUPPLY AND USE FOR EDIBLE AND CRUSHING GRADES 1979-80 AND 1980-81

[In millions of pounds]

	1979	1980
Supply:		
Beginning stocks.....	586	628
Segregation 1 marketings.....	3,840	1,872
Total, segregation 1.....	4,426	2,500
Marketings of segregation 2 plus segregation 3.....	75	360
Total, all qualities.....	4,501	2,860
Exports:		
For edible uses.....	816	420
For crushing uses.....	249	125
Total.....	1,065	545
Domestic use:		
For edible food uses.....	2,028	1,650
For crushing uses.....	570	285
For seed.....	210	230
Total.....	2,808	2,165
Total use.....	3,873	2,710
Ending stocks.....	628	150

¹ Pickouts of small and damaged kernels are assumed to average 15 percent of total domestic purchases for edible food use of 2,075,000,000 pounds.

² Assumed to be from segregation 3 supplies.

as producers cut planted acres by nearly 30 percent and drought cut yields by 15 percent from year earlier levels.

The near doubling of output in 1979-80 led to a very substantial buildup in stocks to over 1 million metric tons or about 40 percent of total use as the market was unable to absorb such large increases so quickly. Sunflowerseed prices for the producers dropped to below 9 cents per pound in 1979-80 after averaging 11 to 12 cents per pound for much of 1978-79. The present recovery in sunflowerseed prices is helped by the reduction in sunflower-seed output as well as the reduction in output of other oil-bearing seeds. Prices could reach new highs in 1981 as stocks are drawn down to quite low levels once again with demand expected to continue strong. Domestic crushing capacity is expanding rapidly and should result in another substantial increase in domestic usage in 1980-81. Exports are expected to be up again with Mexico expected to continue as a good market for sunflowerseeds and some further increase is anticipated in the more traditional markets in Western Europe. The Netherlands, West Germany and Portugal all were major importers of U.S. sunflowerseeds in 1979-80.

OILSEEDS—DISCUSSION

(By T. A. Hieronymus, University of Illinois at Urbana-Champaign)

Being a discussant of the preceding presentation gives me an opportunity to engage in one of my favorite sports: second guessing USDA supply, demand, and price projections. It is, indeed, fortunate that we have current projections before us on a continuous basis. It gives those of us in the forecasting business an ever-present target at which to shoot. And when we get caught with mistakes of our own we can always dodge by pointing out the changes over time in USDA projections.

Actually, I find relatively little to do more than nitpick about in the comments that you have just heard. One central fact stands out: because of the sharp reduction in the U.S. soybean crop the world oilseed picture has suddenly shifted from one of abundance to one of tightness. In this changed situation projections of utilization become easy; the available supply will essentially be used down to a reasonable minimum. All that is at issue is the price that will be required to ration the available supply.

A part of the second guessing game is to search for the most vulnerable spot. I identify this as the projection of U.S. soybean protein exports and its reciprocal, domestic availability of U.S. soybean meal. The projected 825 million bushels of soybean exports plus meal exports of 6.58 million tons equal 26.2 million short tons of meal equivalent, down 8.7 percent from last year. This is not consistent with the long-term trend increase nor with the response to the short soybean crop in 1976.

U.S. soybean protein exports increased from 14.2 million tons in 1969-70 to 28.7 million in 1979-80 and recent increases have been larger than earlier increases. All of this took place in spite of the rapid increase in exports from South America. There is a rapidly increasing world demand for protein supplements for livestock feeding. The increase to Western Europe may be dampened during the year ahead by unfavorable feeding ratios and meal prices that are high in relation to interior feed grain prices. However, the great Eastern Europe and Russian void may more than offset this. In the past, U.S. soybean protein exports have not been price sensitive. In 1976-77, exports were reduced only 1.6 percent in spite of an increase in the average price of 35.2 percent. I doubt that the decrease would have occurred had there not been a very big 1977 soybean crop in sight. The USDA has projected a decrease in soybean protein exports of 8.7 percent but a decrease in domestic use of only 5.4 percent. I doubt that it works out that way.

Should soybean protein exports be maintained at last year's level and disappearance turn out as projected, domestic availability will be

15.7 million tons instead of 18.2 million, a decrease of 18.3 instead of 5.4 percent. This would make a very substantial price difference. The most important factor in the price of soybeans during the year ahead will be the size of the cut in domestic availability of soybean meal and the price that is required to ration supplies.

A second target opportunity is the price of soybean oil. There will be a significant reduction in soybean oil inventory next September 30. In years of declining inventory, prices tend to rise above their long-run average. The average price of soybean oil in 1972 dollars (deflated by the implicit GNP deflator) during the past 10 years was 17.1 cents. In current dollars for the year ahead 17.1 cents is 33.6 cents. This points to the possibility of a price higher than the 28 cents projected.

One additional dimension of the outlook should be mentioned and that is the prospective 1981 crop. Prospective production in 1981 will cast a long shadow back into the 1980 crop price. A large crop will permit pulling carryover down to a bare minimum and weaken prices next summer as in the summer of 1975 but a small crop will move prices up as in 1976 and 1980. We need more acres of soybeans in 1981. But we also need more acres of corn and cotton and there are no more total acres readily available. The market has an interesting problem this winter. The price of soybeans needs to be high enough to pull acres from corn but the price of corn needs to be high enough to pull acres from soybeans. Farmers will be in an interesting quandry during the coming months.

It is well and good for us academic types to work with season average prices, but my farmer clientele could care less. They want to know how high and when. My speculator friends want to make it on both the rise and fall. What is the seasonal pattern in a year like this? This is the third short crop lately. The first was 1974 with a late, wet spring, a hot dry summer and a record early frost. The new crop price rose from an average of \$5.24 in May to an average of \$8.42 in October and then down to an average of \$5.50 in June 1975. The short crop had a long tail. The second was in 1976 with a reduced acreage and poor weather. The new crop price rose from an average of \$4.82 in April to an average of \$6.59 in September, fell to an average of \$6.17 in October, rose to an average of \$9.65 in April before falling to an average of \$5.53 in August. One short crop peaked early, the other peaked late. Such is the nature of speculation. What about this year?

Something can be learned from the structure of the open interest in soybean futures. Table 1 shows end of October open interest in the year before and during each of the three short crop years. Behind the short hedges lie inventories of soybeans so that short hedges are a partial measure of the rate of farmer selling.

With the rising price in 1974, hedges increased a modest 29.4 million from the year before and were 11.7 percent of the crop. Short hedges were only 10.2 million larger than long hedges so that the net long positions of reporting speculators and nonreporting traders combined was quite small. There was not much of a speculative load on the market and the net open interest increased only slightly.

In contrast, short hedges were 62.5 million larger at the end of October 1976 than in 1975. Long hedges were smaller for a net swing of 82.3 million. Short hedges were 15.8 percent as large as the crop. Both

TABLE 1.—FUTURES MARKET POSITIONS OF REPORTING HEDGERS, REPORTING SPECULATORS, AND NONREPORTING TRADERS, AT THE END OF OCTOBER IN CERTAIN YEARS

[In millions of bushels]

	Reporting speculators		Reporting hedgers		Nonreporting traders		Net open interest
	Long	Short	Long	Short	Long	Short	Total
1973-----	6.3	15.5	129.9	112.4	59.8	68.2	195.7
1974-----	12.2	7.1	131.6	141.8	59.5	54.6	203.3
Change-----	+5.9	-8.4	+1.7	+29.4	-.3	-13.6	+7.6
1975-----	10.7	13.5	155.2	140.3	85.5	97.7	251.6
1976-----	42.2	9.6	135.4	202.8	132.7	98.8	310.3
Change-----	+31.3	-3.9	-19.8	+62.5	+47.2	+1.1	+58.7
1979-----	16.2	30.2	222.8	202.8	210.4	216.9	449.4
1980-----	120.3	24.5	244.8	479.5	473.4	335.0	838.5
Change-----	+104.1	-5.7	+22.0	+276.7	+263.0	+118.1	+389.1

reporting speculators and nonreporting traders went from net short in 1975 to net long in 1976. There was a substantial speculative load put on the market. The price failed to rise enough early to cut the rate of use back to the available supply. It was an underspeculated market.

In 1980 short hedges were of record size and more than double the year before. Hedges went from net long 20 million to net short 234.7 million. The short hedges were 27 percent of the crop size. There was a smaller percentage increase in the open interest than there was in the short hedges. Of the swing of 254.7 million from net long to net short by hedgers, 109.8 was picked up by reporting speculators and 144.9 by nonreporting traders. A record speculative load has been put on the market by soybean producers.

Have farmers recognized a price higher than needed to ration a short crop and unloaded on speculators or has the heavy hedging load put on speculators by farmer sales delayed the ultimate rise in price? The contrast between the 1974 and 1976 crops seems to suggest the latter. In 1976 the tipoff to the subsequent bull market was a rate of use during the September–December period larger than could be sustained for the entire year. The rate of use and the progress of the South American crop should give us the answer by early 1981.

U.S. OUTLOOK FOR SWEETENERS AND TROPICAL PRODUCTS

(By Robert D. Barry and Fred Gray, Agricultural Economists, Economics and Statistics Service, U.S. Department of Agriculture)

INTRODUCTION

We are on the upswing of the sugar cycle and price pressures will intensify before they ease. What is also certain is that U.S. sugar supply response is limited by present processing capacity and that U.S. demand for sugar will continue to be large and dependent on world sources for almost half of domestic consumption requirements in 1981. Tied to the world sugar cycle, U.S. prices for sugar will continue to rise.

The key question is when prices will fall. The answer is—perhaps in 1981, perhaps in 1982, and perhaps not to the extent that previous downcycles would lead us to expect. Much depends on weather for the 1981-82 sugar crop, but sugar policies can make the big play; Brazil, India, and the European Community quickly come to mind.

In 1981, the 97th U.S. Congress will be considering general agricultural legislation. Sugar might be included in that legislation, although other policy options for sugar are open. What is certain is that writ large in the sweeteners sky will be HFCS and gasohol, and sugar policy in the United States and abroad will operate increasingly in a food, fuel, foreign exchange, and foreign policy framework.

In today's talk, we shall cover the 1980 and 1981 outlook for sugar, HFCS, other sweeteners, and coffee, tea, and cocoa, in that order. We do not grow coffee, tea, or cocoa but they are important consumer items and U.S. imports of these tropical products exceeded \$5 billion in 1979.

THE SWEETENER SITUATION

Sugar

Prices: The price of raw sugar (c.i.f., duty-paid, New York) advanced 5 cents between September and October 1980, to reach 41.6 cents a pound. That price is 167 percent above the 1979 annual average of 15.6 cents, and is the highest since December 1974 when the monthly average price was 46.7 cents. Changes in world prices are translated almost instantly on a 1-cent-per-1 cent basis to the price for U.S. imported raws. Only shipping costs and a duty of 0.625 cents a pound—the legal minimum—keep the domestic raw price above world levels. In 1979, the average differential between domestic and world raw prices was 5.9 cents a pound because of import fees and a higher duty; today the differential ranges between 1 and 2 cents.

Domestic wholesale prices for refined sugar have followed changes for raws. In the Northeast, wholesale refined cane sugar prices aver-

aged 48.1 cents in September, from the 1979 annual average of 23.2 cents a pound. The differential above imported raw prices reflects mainly refining and marketing charges. Refined beet sugar prices in the Chicago-West marketing territory averaged 44.1 cents in September. These cane and beet sugar prices are reported list prices; sales are usually at a discount from list. Transactions prices for bulk dry beet sugar wholesale (f.o.b. plant) averaged about 34 cents a pound in September, up from the 1979 annual average of 15.4 cents.

The sugar we buy at retail—direct consumption sugar—accounts for nearly a fourth of U.S. use. In September, the retail price of sugar averaged 43.2 cents, the highest since March 1975 when it averaged 49.5 cents. In 1979, sugar at retail averaged 24.9 cents, and in the three seasons September 1976–August 1979 monthly retail prices kept within a stable range of 21.1 and 24.9 cents a pound.

Retail prices of sweetener-containing products have been increasing at a slower rate than sugar prices in 1980. According to the Bureau of Labor Statistics (BLS), retail sugar prices averaged 64 percent higher in September 1980, than in January. In contrast, the Consumer Price Index (CPI) for 16 sweetener-containing foods and beverages rose only 7.7 percent between January and September.¹ The product price increase for the 16 categories ranged from a low of 1.8 percent for frozen fruit and fruit juices to a high of 12 percent for cereal and averaged 7.3 percent for the seven flour-containing product categories in the CPI. Prices for cola and carbonated drinks rose 8–11 percent. Recent increases in wholesale sugar prices are not yet fully reflected in higher retail prices of sugar-containing products. The current situation is the opposite of what occurred during 1979 when sugar-containing products increased an average of 8 percent between January and December, and retail prices increased only 3.5 percent during the same period.

Production: U.S. production of cane and beet sugar (excluding Puerto Rico) in crop year 1980–81 will be almost 2 percent up from last season. Total beet and cane sugar output of 5.7 million tons (raw value) is about 1.3 million less than the record in 1975–76. On a calendar year basis, 1980 production estimated at 5.6 million tons will be down 3.5 percent from 1979—reflecting a portion of the low 1979–80 crop.

Sugarbeet harvested area in 1980–81 is estimated at 1.17 million acres about 4.5 percent above last season, with the larger increases in Colorado, Idaho, Nebraska, and Texas. Prospective U.S. beet yields are about 19.8 tons an acre, up a percent from 1979–80. In the Red River Valley (Minnesota–North Dakota), the largest producing area, yields and production will be down from last season although rain and mild weather during September helped ease the effects of a severe drought this past summer. Total beet sugar production from the 1980–81 crop is expected to reach 3 million tons, raw value equivalent, up from 2.88 million in 1979–80.

Sugarcane area (including seed) for harvest will likely total around 736,000 acres in 1980–81, marginally above the previous season. Acreage expanded about 2 percent in Florida and slightly in Texas and

¹ Measured by the simple average of the BLS indexes for the 16 product categories.

Hawaii, but dropped nearly 3 percent in Louisiana. This fall, 24 sugar-cane mills are scheduled to operate in Louisiana, 1 less than last year and 8 less than in 1976. The projected U.S. average cane yield for the 1980-81 crop is 37.4 tons an acre, up 1.2 tons from the previous season. Total cane sugar production is estimated to be about 2.7 million tons (raw value), the same as 1979-80.

Utilization: Calendar 1980 sugar deliveries, based on the trend for the most recent 12 months, will likely total around 10.5 million short tons (raw value) compared with 10.76 million in 1979. Deliveries through September 1980 are about 4 percent below a year ago.

U.S. consumption of refined sugar (approximately by sugar deliveries) will be about 9.8 million tons in 1980. With a population of 222.6 million, U.S. per capita refined sugar use will be 88.2 pounds, a decrease of 2.9 pounds from the previous year.

Trade: The U.S. generally imports about 45 percent of its annual sugar consumption. Imports in 1980 are expected to fall more than 400,000 tons from last year, to about 4.6 million. Stocks have been drawn on and permitted to fall partly because of high interest rates.

U.S. exports of sugar will be a record in 1980, probably approximating 500,000 tons compared with only 18,000 tons in 1979. Title 19 U.S. Code 1313 permits the "drawback" or refund of duties and fees paid by U.S. importers of raw sugar when an equivalent amount of sugar is reexported. Sizable exports through July 1980 have gone to Peru (54,000 tons), Mexico (43,000 tons), Algeria, Egypt, Chile, Syria, and several other countries. About 85 percent has been in the form of refined sugar.

Stocks: Domestic sugar stocks at the end of August 1980 totaled 1.87 million short tons (raw value), down 353,500 tons from last year. Refiners' stocks are up by 401,700 tons but beet processors' and mainland cane processors' stocks have dropped a combined 583,400 tons, and Commodity Credit Corporation stocks are only 30,400 tons (all beet), down from 202,300 tons in 1979.

Lower U.S. production and imports, lower domestic utilization but much greater exports will result in a decrease in overall U.S. stocks of about 800,000 tons. On January 1, 1981, stocks are projected to fall to 2.9 million tons, the lowest since 1976.

Corn sweeteners

Prices: Corn sweetener prices have increased sharply in 1980. The September monthly average of 27.70 cents a pound (dry basis—^{db}) for 42-percent high fructose corn sirup (HFCS) in the Chicago-West marketing territory was nearly double the January price. Comparable glucose corn sirup price increases ranged from 65 to over 80 percent higher in most marketing territories. Glucose corn sirup was selling for over 26 cents a pound (dry basis) in California, and over 21 cents in the Northeast and Chicago-West marketing territories. The September price of refined dextrose averaged nearly 32 cents a pound in the Chicago-West marketing territory, nearly 75 percent higher than in January. Price increases in other territories were comparable. These recent corn sweetener price levels are higher than in 1974-75 when sugar prices were record-high.

An important factor affecting corn sweetener prices is the price of sugar. This is so particularly for HFCS which is a close substitute for

sugar in many beverage and food uses. Pricing HFCS below sugar has greatly aided the growth of demand for the corn sweetener. Corn sweetener prices have been spurred by the upward thrust of sugar prices this year, and also by tight processing capacity, the need to recoup the high cost of investment in new corn processing plants, and higher corn prices.

Corn prices have continued to strengthen from last year. Prices of No. 2 Yellow corn averaged \$3.44 a bushel in August, about 35 percent above January. Normally, corn sweetener producers are able to partially offset higher corn prices with higher prices for corn wet-milling by-products, but that did not occur this year. Corn gluten meal (60 percent protein) prices and corn oil prices in August were nearly the same as in January though up 30-35 percent from April. Corn gluten feed (21 percent protein) in August were down 12 percent from January, though up 18 percent from April.

This year's smaller corn crop of 6.47 billion bushels, down 17 percent below 1979's record crop, means that corn prices will likely continue high for sometime. Prices of valuable corn refiner products can also be expected to increase, benefiting corn wet-millers accordingly.

Production: The U.S. wet-milling grind in 1980 is likely to reach 465 million bushels, up about 5 percent from 1979. Nearly 70 percent of the recovered starch is estimated to be processed into corn sweeteners, with the rest sold as corn starch and dextrin.

Total domestic shipments of corn sweeteners for food use in 1980 are expected to total around 4.6 million short tons (dry basis) up sharply from 4 million in 1979. Most of the increase is coming from approximately a 20 percent rise in HFCS sales this year, particularly for 55-percent-fructose HFCS.

HFCS sales in 1980 may total around 2.1 million short tons (dry basis), up from 1.75 million in 1979. More would be sold if available. Trade sources confirm that HFCS use in beverages will be up about 30 percent from last year.

Glucose corn sirup shipments for food use in 1980 are expected to increase slightly to 2.05 million tons (dry basis) from about 2 million in 1979. Dextrose shipments for food use may total around 425,000 tons, up more than 10 percent from 400,000 tons last year.

Per capita consumption of corn sweeteners may reach 41 pounds (dry basis) in 1980, 4 pounds above 1979. Most of the increase will be in HFCS, from 15.4 pounds to nearly 19 pounds. Per capita use of HFCS in 1980 will exceed glucose corn sirup consumption for the first time. Glucose corn sirup intake is expected to reach 18.4 pounds per capita, up about 0.2 pounds. A similar slight increase is likely in dextrose use, with consumption in 1980 estimated at 3.8 pounds—the first increase in per capita dextrose use since 1975.

Caloric and noncaloric sweeteners

Honey production in 1980 may total 200 to 205 million pounds, down from 237.3 million in 1979. Wholesale prices rose slightly in October, to nearly 53 cents for white honey. Some further modest price increases can be expected as world honey supplies cannot increase much before next summer. The U.S. average support price is 50.3 cents a pound for 1980 crop honey, but high sugar prices will also buttress honey prices

as some consumers shift to honey as an alternative sweetener. U.S. honey imports in 1980 may total 50 million pounds, down one-fifth from 1979. Exports are running below the 1979 pace and are unlikely to top last year's 8.8 million pounds. Total 1980 domestic disappearance of honey will likely decline about 10 percent.

U.S. maple syrup production of 973,000 gallons in 1980 is down 20 percent. Producers received a record \$15.60 a gallon for 1980 crop maple syrup, up from \$14.10 in 1979. Imports are about one-tenth below last year and seem likely to total 8 to 10 million pounds in 1980.

The status of noncaloric sweeteners has been affected by some recent findings and decisions. Cyclamate was banned for domestic food use effective 1970. In a 311-page decision, the Food and Drug Administration (FDA) affirmed the initial administrative law judge decision against use of the sweetener. The FDA maintained that the major producing company had failed to prove that cyclamate was not a carcinogen and does not cause genetic damage. The company's efforts to restore cyclamate use for diabetics and dieters will apparently be abandoned.

Another noncaloric sweetener, aspartame, was subject of a suit in the U.S. district court in Washington, D.C., on October 1, 1980, to require the FDA to issue a final decision on the Government's 7-year investigation of the chemical's safety. The FDA granted a food additive petition in 1974 for using aspartame, but then stayed the approval in December 1975 for further study. Meanwhile, a scientific panel of inquiry convened by the FDA recommended that aspartame be kept off the market at least until questions concerning its potential to cause cancer are answered by further research.

Saccharin is currently considered safe for human consumption by the FDA. Action to change the current market status of saccharin has been delayed pending the review of recent studies which found little or no association or excess risk with saccharin consumption and bladder cancer in test animals.

THE SWEETENER OUTLOOK

Sugar

The tide of world sugar prices will continue to rise over the next few months and U.S. sugar prices will be swept with that tide. The crest could come next summer depending on world production prospects. On the other hand, if the 1981-82 world production does not rise enough to cover consumption, prices will maintain momentum and the downswing of the sugar cycle may not start until 1982.

Even if there is an approximate balance of production and consumption in the 1981-82 season, U.S. raw sugar prices—c.i.f. duty-paid, New York—would still be expected to average substantially above the 1980 estimated average of around 30 cents a pound. It would not be surprising to see raw prices average over 40 cents for the calendar year.

If the world sugar downcycle does not occur in 1981 and world stocks continue their decline, domestic raw sugar prices would likely exceed 50 cents a pound.

Wholesale and retail prices for refined sugar in 1981 can be expected to follow the course of domestic raw prices. In 1980, retail prices will likely average above the 1975 record annual price of 37.2 cents a pound.

Retail prices during January to September averaged 35.8 cents and at an estimated 43 cents in the 4th quarter, the 1980 average would be 37.6 cents a pound.

Comparisons of 1980 with 1974-75 in terms of market tightness are premature. If the 1974-75 prices were adjusted for inflation, current prices would be far below the 1974-75 levels. A more appropriate scenario to match 1974-75 would be 1981-82, if world stocks again are drawn down.

DOMESTIC RAW SUGAR (C.I.F., DUTY PAID, NEW YORK)

	Cents per pound	Retail refined sugar
Record monthly average price, 1974...	1 57.50	² 62.8
Annual average price, 1974.....	29.5	32.3
Annual average price, 1975.....	22.5	37.2
Record monthly average price, 1974.....	13 96.0	² 104.9
Annual average price, 1974.....	3 49.3	53.9
Annual average price, 1975.....	3 34.9	57.7

¹ November. ² December. ³ In 1980 dollars.

High prices for sugar make possible the consideration of no program for the 1980-81 crop. Also under consideration is a program to support prices to domestic producers of 1980-81 crop sugarbeets and sugarcane either through purchase agreements made by the CCC with sugar processors or nonrecourse loans made to the processors. The price support program would be implemented under existing authorities (section 301 of the Agricultural Act of 1949, as amended) and would provide continuation of price support coverage that would not otherwise exist for beet and cane producers.

U.S. sugar production in 1981 is expected to increase only moderately from this year's level. Sugarbeet planted acreage in 1980-81 will likely rise, but any large potential expansion would be constrained by lack of processing capacity. Beet sugar production in calendar 1981 will be partly from the 1980-81 crop and partly the 1981-82 crop, and so may rise only around 5 percent. Not much expansion can be expected in sugarcane area, and with possibly lower yields (based on the long-term trend) cane sugar production in 1981 may just approximate the 1980 level. The first official indication of next year's sugarbeet acreage will come in the January "Prospective Plantings" report, and the first indication of sugarcane acreage will be the quantity of seed cane planted in 1980, which will be reported in the January "Crop Production—Annual."

U.S. imports of sugar in 1981 will probably rise, perhaps by over 5 percent, as stocks will be considerably reduced at the end of 1980. Refiners will likely continue to export a large quantity of sugar. With consumption estimated to decline to 10.3 million short tons (raw value), sugar stocks at the end of the 1981 calendar year would be near the beginning stocks estimated at 2.9 million tons on January 1, 1981.

Corn sweeteners

Present market trends and prospective production capacity suggest HFCS sales could come close to 2.5 million short tons (dry basis) in

1981. If realized this would be an increase of about 20 percent, similar to the expected increase in 1980. HFCS sales would then be equivalent to over one-fourth of total refined sugar deliveries in 1981. Glucose sales for food use may increase 2.5 percent in 1981 to around 2.1 million short tons. Dextrose shipments for food use may total around 450,000 tons, up nearly 6 percent from 1980. Thus, total corn sweetener shipments for food use may approximate 5 million short tons (dry basis) in calendar 1981 equivalent to about a third of estimated total caloric sweetener use.

The corn wet milling grind may top 500,000 bushels in 1981, up nearly 8 percent from the 1980 estimate and equivalent to about 8 percent of the 1980 corn crop. This does not include the corn dry milled for corn chips and similar products, nor the corn used to produce industrial alcohol.

If corn sweetener prices remain near recent levels for the rest of the year, dextrose prices for 1980 would average about 65 percent higher than in 1979, while HFCS prices would average over 75 percent higher. Glucose corn sirup prices would average nearly 52 percent higher in the Northeast and nearly 63 percent higher in the Chicago-West marketing territory. Corn sweetener prices in 1981 will average above 1980 levels and could significantly increase as corn and energy input prices could rise appreciably. Higher sugar prices will tend to boost corn sweetener prices, especially HFCS.

Sweetener consumption

While U.S. per capita sugar consumption is decreasing, total consumption of caloric sweeteners continues to increase. From 122.6 pounds per capita in 1970, total caloric sweetener intake will rise to an estimated 130 pounds in 1980. Consumption of sugar per capita peaked in 1972 at 102.8 pounds, and has steadily declined since 1977. Much of sugar's loss is accounted for by HFCS gains, as HFCS use increased from 0.7 pounds per capita to 9.6 pounds in 1977 and an estimated 18.3 pounds in 1980. With the decision by major beverage manufacturers to permit HFCS in their top-brand colas, the horizon for HFCS has immensely widened; production capacity is being rapidly expanded. In 1981, U.S. sugar consumption is expected to drop another 200,000 short tons (raw value) and refined sugar use would then fall to 85.7 pounds per capita, the lowest since the sugar-short years of the 1940's. Per capita consumption of HFCS is estimated to reach 20.8 pounds, and that of other caloric sweeteners (glucose corn sirup, dextrose, honey, and edible sirups) may increase slightly.

Noncaloric sweetener (saccharin) consumption in 1981 is estimated about the same as this year, about 7 pounds per capita (in sugar-sweetness equivalent; actual consumption is about 7/300th or 0.023 pounds).

OUTLOOK FOR COFFEE, TEA, AND COCOA

Coffee

U.S. imports of coffee (green and processed) for the first 8 months of 1980 totaled 1.69 billion pounds, down 5 percent from 1979. At this rate, calendar 1980 imports would total 2.5 billion pounds compared with 2.66 billion last year. However, despite a lower volume and recently declining green coffee prices, the 1980 dollar value of imports

may still exceed the 1979 total of \$4.1 billion. Through August 1980, coffee imports were valued at \$2.95 billion, up nearly 20 percent from the same period in 1979.

In 1979, the pattern for green coffee prices ² showed an increase from \$1.81 a pound in January to \$2 in July, before easing and averaging \$1.70 for the calendar year. In 1980, green prices increased from \$1.66 a pound in January to a 1980 monthly average high of \$1.82 in May, before easing to around \$1.25 in September. The May price rise reflected a temporary seasonal concern over a possible freeze in Brazil. When the freeze did not occur, prices once again started to decline. Underlying factors are:

- (a) The potential for a considerable increase (30-40 percent) in Brazilian coffee production in 1981-82;
- (b) Consumer resistance to high prices, resulting in an easing of demand;
- (c) An apparent relaxation of market price support activity by Pancafe, the international coffee cartel.
- (d) Decline in the percentage of people drinking coffee, especially in the United States and in the quantity consumed per capita among those who do.

The price decline in 1980 may be limited, however, by the International Coffee Agreement (ICA) trigger price mechanism: as the composite price for green coffee falls within a \$1.15-\$1.55 per pound range, successive cuts in export quotas of ICA-member countries are introduced to help stabilize prices.

U.S. wholesale prices of roasted coffee in 1980 have begun to decline, following the lead of green bean prices. Wholesale prices averaged \$2.84 a pound in September, down 7 percent from \$3.05 in January. The September price is still above the 1979 annual average price of \$2.74. Retail prices averaged \$3.28 a pound in September, down 4 percent from the year-high price of \$3.41 in January. Most of the decrease in green coffee prices has not yet been reflected at the wholesale and retail levels.

U.S. per capita consumption of coffee in 1980 is likely to average about 10.5 pounds (green bean equivalent), down from 11.5 pounds last year. Increases in coffee consumption as a result of lower prices for green coffee may not take place in 1981, because of the lag in transmitting price changes to wholesale and retail.

Tea

U.S. tea imports totaled 142 million pounds (dry leaf basis) during January-September 1980, up nearly 12 percent from 127 million during the same period in 1979. The high level of tea imports reflects:

- (a) An anticipated dock strike that never materialized which would have become effective September 1;
- (b) An unusual hot summer which stimulated use of iced tea, the largest market segment;
- (c) Relatively low tea imports of 151 million pounds in 1978 and 174 million in 1979 after a record import of 202 million in 1977;

² Composite indicator price as defined in the 1976 International Coffee Agreement.

- (d) Retail tea prices which increased only slightly in 1980 despite cost inflation in processing, packaging, and distribution;
- (e) Relatively high retail coffee prices, which declined very slowly this year, thereby encouraging more tea consumption.

Fourth-quarter imports are expected to pull back from the earlier import pace, however, and overall 1980 imports may rise only moderately, perhaps to 180 million pounds.

Retail tea prices increased only slightly in 1980. A package of 48 tea bags cost \$1.50 in New York City in August, up from \$1.43 in August 1979. The retail price in the Richmond and Norfolk metropolitan areas in August was around \$1.40 to \$1.43 for a package of 48 tea bags, up around 7 percent from the previous year (mainly from increased handling costs). Wholesale tea prices have not increased in recent months, and in the London Auction Tea Market may average around \$1 a pound in 1980 compared with 98 cents in 1979.

Wholesale tea prices are not expected to change much from current levels into early 1981. With a record world tea crop being harvested in 1980-81, wholesale prices could weaken slightly. Higher sugar prices may reduce tea consumption; on the other hand, unsweetened tea is a very low priced beverage whose relative price advantage seems likely to improve in 1981, and total tea consumption could be up.

Cocoa and chocolate

In last year's outlook talk, we forecast that "with more plentiful cocoa supplies and lower prices in prospect, cocoa imports and grindings are likely to increase some in calendar 1980." The first part of that statement is alright, but the second part needs adjusting. Instead of an increase, total cocoa imports are running about 10 percent below last year's rate. Imports of semiprocessed cocoa and chocolate products are up about 11 percent, but cocoa bean imports have dropped considerably. Net bean imports in 1980 will likely be well short of 1979's 350 million pounds, as the import rate is down about 20 percent. In the first 7 months of 1980, imports of semiprocessed cocoa and chocolate products totaled 234 million pounds (cocoa bean equivalent—CBE), with unsweetened chocolate up 7 percent; cocoa butter up 27 percent; and unsweetened cocoa up 4 percent.

The cocoa bean grind, contrary to last year's expectation of a slight increase, totaled only 219 million pounds through September 1980, down about 20 percent from last year.

Based on 8 months of data, total 1980 domestic use of cocoa and chocolate products seems likely to fall below 1979's 730 million pounds (CBE), after slipping about 2 percent last year. Per capita consumption of cocoa and chocolate would then decline slightly below 1979's 3.3 pounds.

New York cocoa bean prices (the average of the nearest-three active futures trading months on the Coffee, Sugar and Cocoa Exchange) fell from \$1.39 a pound in January 1980 to \$1.01 in October. With another record cocoa crop in prospect and an expected rise in global cocoa stocks for the fourth consecutive season, prices will face continued downward pressure.

Reflecting lower prices and quantity of bean imports, the total value of U.S. imports of cocoa and products in 1980 fell to \$503 million from

\$688 million for the January-August period. Cocoa bean imports declined to \$226 million from \$368 million (about a 40 percent decline) but imports of semiprocessed and consumer products also fell, by about 13 percent.

In 1981, should cocoa prices continue to fall, domestic manufacturers who have been reluctant to change their product formulas away from cocoa substitutes and cocoa butter extenders may review their policy and use more cocoa. The potential increase in total U.S. cocoa consumption, however, could be muted by high sugar prices, and by rising manufacturing and distribution costs which could mean little or no easing in retail prices of cocoa and chocolate.

WORLD OUTLOOK FOR SUGAR AND TROPICAL PRODUCTS

(By Alvin E. Gilbert, Foreign Agricultural Service,
U.S. Department of Agriculture)

INTRODUCTION

This paper covers the world situation and outlook for a number of commodities—sugar, coffee, cocoa, and tea. Only one of these, sugar, has a direct link to the U.S. agricultural sector, but each of the commodities has an impact on the American consumer. The situation described herein is the situation prevailing at the time it was written, 10 days to 2 weeks ago. It is still largely up-to-date but specific events in different parts of the world may have altered the situation some. This is particularly true in the case of sugar where the beet harvest in Europe and the Soviet Union was still in doubt as of early November. In any case, sugar production is again expected to be considerably below consumption in 1980-81 with only the degree of shortfall in question. In coffee, consumption and exports in producing countries will exceed production and are expected to bring stocks in those countries to low levels. However, there may be a buildup in stocks in consuming countries and worldwide production and consumption should remain approximately in balance. World cocoa production is forecast to be up slightly in 1980-81, while grindings are expected to be down, thus indicating a stock buildup for the fourth consecutive year. World tea production in 1980 is forecast at 2.6 percent over 1979 and should more than meet consumption needs. The longer term outlook is for increasing production over the next decade, but at a decreasing rate.

SUGAR

Our first estimate of world sugar output in 1980-81 is for a crop of 87.5 million metric tons, up almost 4 percent from our revised estimate of 84.2 million tons for 1979-80. Assuming a world consumption offtake in 1980-81 of 90.5 million tons, this would indicate a further drawdown in stocks of about 3 million tons. Based on our latest supply and distribution calculations, world sugar stocks totaled about 24.1 million tons at the end of 1979-80. A further drawdown of 3 million tons would reduce the stock level to about 21.1 million tons at the end of 1980-81, or to about 23 percent of annual world consumption needs. Of course, the higher prices brought on by this tight supply situation could further reduce demand as they seem to have done in 1979-80. Our revised supply and distribution figures indicate a global consumption increase of less than 1 percent in 1979-80.

The past year has, to say the least, been an active one for the world of sugar. When we met here a year ago, the New York (world) spot

price was at the 13-cent level and on its way up. Today, as you know, the price is more than 40 cents and is still on its way up. It appears that this upward trend will continue at least into mid-1981 and perhaps longer, depending on the then prevailing crop prospects for 1981-82. The year has also seen the lifting of all International Sugar Agreement export quotas and stockholding requirements; we are now operating largely in a free market situation.

The most important factors in this world situation are conditions in the Soviet Union and in Cuba. The Soviets appear in for another bad year due principally to weather problems. Weather forced late planting and the resulting late crop faces the danger of frost damage at the other end of the growing cycle. This situation has been worsened by greater than normal problems in getting the beets from the fields to the mills. Good last minute weather could still have helped this crop but recent reports are not optimistic and it seems clear that the Soviets will again have to import heavily. Normally this would merely mean increased imports from Cuba, but that country is also having its production problems.

While the major problem in Cuba appears to be the rust disease which has struck its most widely planted variety, we should keep in mind that the country is in the midst a campaign to expand acreage and production, at least partly through the increased use of mechanization. A situation that calls for quick elimination and replacement of thousands of acres of a highly susceptible variety, while at the same time meeting normal production and maintenance problems, calls for the best of organization and management. From the sketchy reports coming out of Cuba, all does not appear to be going well and prospects are for an even poorer crop in 1980-81 than prevailed last year. While some sources indicate more disastrous results, we forecast a crop of about 6 million tons.

Further to the south, in Brazil, the situation is much brighter. In that country, production is projected at 8.2 million tons, up 17 percent from 1979-80. At the same time Brazil expects to further increase its alcohol (from sugarcane) output as well as the number of cars that will operate on that product. While officials there maintain that the alcohol program will continue no matter what the world sugar situation, one suspects that at some point the lure of the foreign exchange earning potential of sugar will bring a change in that policy. On the other hand, since the outbreak of the Iraq-Iran war, Brazil has publicly indicated that in case of any permanent shutoff in its petroleum supplies from that part of the world, it may have to divert more for its cane to alcohol and thus have less sugar for export.

Elsewhere in this hemisphere we expect production to be up slightly in the coming year. Here in the United States we expect slight increases in most segments of the industry. (My colleague from ESS will get into the domestic situation more thoroughly). We expect some increase in the Mexican crop in the coming year but imports will still be needed, we think at the level of about 500,000 tons. The Dominican Republic also expects to bring in a more normal crop in 1980-81 and should have increased availabilities for export. Nicaragua foresees some solid recovery from its strife-torn years, while little recovery is foreseen in El Salvador. Guatemala sees a sizable jump in production in

1980-81. (There is a production table attached to this paper showing our initial estimates for individual countries in 1980-81.)

On the South American Continent, Argentine production is forecast to be up more than 18 percent to 1.65 million tons, while Colombia expects a more modest jump to about 1.22 million. In Chile, where production has dropped drastically in recent years, officials are encouraging a rapid expansion of beet sugar production and they foresee an increase of more than 200 percent this year. Production continues its downward trend in Peru and that country will again be a net importer. Though weather gets much of the blame for production problems in Peru many feel the problem is much broader than weather. Modest production increases are expected in Venezuela, Ecuador, and Bolivia.

In Europe the forecast is for a slight reduction in the overall level, which has been above normal in each of the last 3 years. In the European Community a better crop in France will be more than offset by reductions in Germany, the United Kingdom and the others. The demand for EC sugar over the past year has dampened efforts to reduce production quotas with an eye to saving on export subsidy costs (in more normal market conditions). However, it does appear there will be an effort toward a modest reduction in the coming year. There is also likely to be some communication with the ISA regarding possible membership, but chances for the EC's joining the present agreement would have to be judged as poor.

Elsewhere in Western Europe, Spain will make a strong recovery from its bad year in 1979-80 but will not quite make it back to its level of recent years. Spain has backed away from its policy that encouraged farmers away from sugar to other crops.

In Eastern Europe, production is projected to be down almost 9 percent due largely to late plantings and rains that disrupted operations particularly in the more eastern areas. The largest producer in the area, Poland, will be hurt the most.

Production is also expected to be down in Africa, with the biggest decrease coming in South Africa following drought conditions there in the first half of the sugar year. In the long term however, production should move upward in the absence of Sugar Agreement export restrictions. In Mauritius, cyclones are believed to have cut production almost a third. On the brighter side modest increases are expected in Egypt, Ethiopia, Swaziland and the newly independent Zimbabwe (formerly Rhodesia). Hope is also high in the Sudan with a projected 400,000 tons in 1980-81 compared to only about half that quantity estimated to have been produced this past year.

In Asia, sugar output in 1980-81 is projected to be up about 13 percent with the biggest increase coming in India. Planted area is up about 7 percent in that country largely as a result of the encouraging prices received by growers in the preceding season. Production was also helped by more than adequate rainfall (after the poor monsoon which hurt the 1979-80 crop). The situation in India remains a volatile one with the ever present gur and khandsari producers ready to step in and pay the higher prices for cane if supplies are tight and sugar prices are high. Imports will probably be needed again in 1980-81 as the country rebuilds stocks from the low level prevailing at the end of 1979-80. Khandsari production (which is included in USDA

centrifugal production estimates) and consumption are expected to again run at about one million tons. Gur production (which is not included in USDA estimates) runs at about 6 million tons a year and enjoys a special consumer demand in rural areas. Gur is free from most government controls and will draw cane away from the centrifugal sugar mills in years of good prices such as in 1979-80.

China is another big producer and consumer in this part of the world, but definitive information on the situation there is lacking. The Chinese have, however, announced a push toward self-sufficiency in sugar and we do expect some production increase in 1980-81, especially from beets.

The Philippines is expected to increase its production and exports in 1980-81, in the absence of the International Sugar Agreement export restrictions that prevailed over the last 2 years. Good weather will bring about a 4 percent production increase in spite of a slight reduction in harvested area. Given present prices we expect that the planted area will increase in 1981-82. Philippine mills were operating below capacity in 1979-80 so no new mills are planned. Some of the existing mills, however, are modernizing and this will add to milling capacity. Philippine exports were up some 60 percent in 1979-80 and are expected to be up another 5 percent in 1980-81.

Thailand expects some recovery to 1.3 million tons in 1980-81 after the drought-hit 1979-80 crop when only about a million tons was produced. Exports totaled a million tons in 1979-80, however, before the Government stopped issuing export licenses due to a tightening domestic supply situation. In 1980-81 shipments are likely to be not more than half a million tons, due both to the poor production performance in 1979-80 and to continuing problems in the domestic market. If these are worked out, our man there expects that most of unfulfilled contracts of this past year will be honored in 1981. The alcohol industry is expanding in Thailand and is expecting to use 14 percent more molasses in 1980-81. Fuel alcohol production is expected to receive special attention in Thailand's next 5-year plan (1982-86).

Pakistan reports a 15 percent increase in planted area for the 1980-81 crop and we foresee this will produce 725,000 tons of sugar, up substantially from the 571,000 ton output in 1979-80. Imports will still be needed however. In Bangladesh, government is still pushing toward self-sufficiency, a sometimes elusive goal. Production in 1980-81 is projected at 169,000 tons compared to estimated consumption needs of 182,000 tons. Turkey, which had been practically self-sufficient as recently as 1977, was forced to import about 200,000 tons in 1979-80, and probably will exceed that in 1980-81.

In Japan, consumption is trending downward and imports are expected to drop accordingly from 2.48 million tons in 1979-80 to 2.03 million in 1980-81. Much of this decline is due to an expanding share of the market going to corn sweeteners which are presently available at lower cost. Sugar production in 1980-81, at 765,000 tons, will meet about 25 percent of the country's sugar needs.

In Oceania, Australia will up its production about 10 percent after restraining output the past 2 years in order to live within its ISA quota. Exports should be up accordingly to about 2.6 million tons, as compared to 2.3 million 1979-80 (aided by ISA stock releases) and

only 2 million in 1978-79. There is little competition from other sweeteners in Australia. Surveys have been made into the feasibility of such plants but they appear too uneconomic at present price levels. Production in Fiji is expected to be up again in 1980-81 to about 500,000 tons.

INTERNATIONAL SUGAR AGREEMENT

With the President's signing of implementing legislation last April, the United States finally became a full-fledged member of the International Sugar Agreement (ISA). By that time, however, rising prices had passed through all the trigger points of the agreement, all quotas had been suspended, all reserve stocks had been released, and there were no longer restrictions on any member importing sugar from, or exporting sugar to, any origin or destination. The U.S. action did, however, enable the International Sugar Organization to at long last put into effect the contribution fee system under which all free market sugar exported from, or imported into, member countries must carry documentation to show that a contribution fee of 50 U.S. cents per metric ton has been paid into the ISO's stock financing fund. This fund will be a source of loans to exporting members to help finance the holding of stocks, should that again become necessary. It is not likely that such loans will be needed for some time, however, since members will not be required to hold stocks again until the world price comes back down to below 16 cents; this does not appear imminent.

The present agreement is scheduled to expire at the end of 1982, so negotiations to extend or amend it will likely take place during that year. That still seems a good distance away, but present events in the sugar world will play heavily on the success or failure of those negotiations. Cuba, for example, has just had one bad production year and promises to have another in 1980-81. This means that its exports are likely to be down during the period. The agreement specifically says a country has to perform to maintain its basic export quota; otherwise its quota has to be reduced and given to exporters that can perform. Cuba has already let it be known that it is not likely to stand for any cut in its quota, and that its very participation in the agreement would be doubtful if its quota were to be so reduced.

The ISA's governing council is meeting in London this week. Of principal interest will be the annual review of the agreement's target price range—now 12 to 22 cents. It is expected that exporting members will seek an increase in the range and that importers will resist such an increase. Any action taken would not have any influence on the market until such time that prices fall back into that range. The discussions will, however, give some indication as to the problems that lie ahead when the agreement is renegotiated in 1982.

COFFEE

World coffee production estimates are currently unchanged between 1979-80 and 1980-81 at 80.1 million bags—60 kilograms each. During 1980-81 domestic consumption and export sales will exceed production bringing year-end stocks in producing countries to their lowest level in more than 20 years. However, actual production and consumption levels should remain approximately in balance worldwide, if there is a continued stock buildup in consuming countries. The trend in stock

levels should be reversed in 1981-82, if the expected 5-8 million bag increase in Brazilian production materializes.

Coffee prices held firm at relatively high levels until June 1980, when they began a rapid decline to their current \$1.20 to \$1.30 per pound range. The current level is only slightly above the average price in constant terms, for 1972 and 1973. In order to prevent a further price decline and also provide increased price stability, coffee producing and consuming countries of the International Coffee Organization (ICO) on October 3, 1980 agreed to establish an export quota system with cuts and enlargements within a \$1.15 to \$1.55 price band. The agreement was made retroactively effective for the international coffee crop year beginning October 1, 1980.

Production

Overall, the trend in world coffee production is closely tied to Brazil's progress toward a return to the pre-1975 frost level of output of 30 million bags. The trend was interrupted by the May 30-June 1, 1980 frost which affected production in several States. As a result, Brazil is expected to harvest only 21.5 million bags from the 1980-81 crop. Barring the remote possibility of an extensive drought, Brazilian coffee production should recover to at least 27 to 29 million bags in 1981-1981-82.

Production of coffee in Colombia, the world's second largest supplier, is conservatively estimated at 12.4 million bags in 1980-81, up 100,000 bags from the latest estimate for 1970-80. Over the next 5 years, Colombian production should remain within the 12-13 million bag range, unless the high and rising costs of inputs, such as labor and fertilizer, make their optimum use unremunerative, in which case production could decline below the 12 million bag level.

In Central America, a decrease of 430,000 bags expected for the 1980-81 harvest in El Salvador, due to the civil war and other factors, will be more than offset by increases of over 300,000 bags each in Costa Rica and the Dominican Republic. Production will also be up in Guatemala, Mexico, Nicaragua and Honduras, but down in Haiti due to hurricane Allen.

African production will decline slightly between 1979-80 and 1980-81, as lower estimates for Angola, Burundi, Cameroon, Rwanda and Kenya more than offset increases in Ethiopia, Ivory Coast, Tanzania, and Uganda.

Among the major producers in Asia and Oceania, India will harvest a smaller crop while Indonesian production will be up.

Trade/consumption

Based on the supply and distribution analysis contained in FAS Coffee circular FCOF 4-80 (October), world coffee exports, including roasted/ground and soluble coffees in their green bean equivalents, were expected to rise to 62.5 million bags during 1980/81, up 1.2 million bags from 1979-80. The actual level may be slightly reduced, due to the establishment of ICO export quotas among producing members of the organizations. Ninety-four percent of all coffee exports from producing countries occurs in the green bean form. The portion represented by soluble coffee has risen rapidly so that it now accounts for 5.7 percent of the total. The remaining 0.3 percent of world trade in coffee occurs in the roasted/ground form.

Brazil, the world's largest supplier, should export about 15 million bags during 1980-81, including the green bean equivalent of 3 million bags of soluble. This would be 1.5 million bags above the levels recorded for 1978-79 and 1979-80. Other major exporters, mainly of green coffee, in order of importance are Colombia (10.1 million bags), Indonesia (4.2 million bags), Ivory Coast (4 million bags), Uganda (2.6 million bags), Mexico (2.5 million bags), and Guatemala, (2.3 million bags).

Consumption of coffee in producing countries is expected to grow by about 2 percent between 1979-80 and 1980-81, to 20 million bags. While the exact level of total world consumption is not known, a measure of the level can be derived by combining coffee exports and producer country consumption. In 1980-81 the combined figure is estimated at 82.5 million bags, up 1.6 million bags or 1.9 percent from 1979-80. A major portion of the increase may have gone into consumer country stocks.

Stocks

Carryover stocks in producing countries totaled about 24.6 million bags at the end of 1979-80. They are expected to fall to 22.6 million bags at the end of 1980-81, the lowest level in over 20 years, and only slightly more than one-quarter the estimated 86.2 million bags held at the end of the 1965-66 coffee year.

Prices

Coffee prices have fluxuated considerably since 1975, reflecting uncertainties over production, supply and demand levels. During 1980, green coffee prices reached their highest level for the year in mid-May at \$1.86 per pound. Prices remained within the \$1.50 to \$2 per pound price range as long as the Bogota Group of eight Latin American producing countries intervened positively in the cash and futures markets in London and New York. They declined rapidly after the group's buying activities were curtailed, about mid-year, possibly for financial reasons. Prices reached a low of \$1.21 per pound in late September, during the International Coffee Organization meeting London, when prospects for an export quota agreement to support world coffee prices did not appear promising.

After agreement was reached in October 3, prices firmed slightly to \$1.31 per pound by mid-October, before stabilizing between \$1.20 to \$1.30 per pound. During 1981, the effectiveness of the new quota scheme for holding the ICO's composite indicator price above the \$1.15 minimum will be severely tested, because world coffee supplies based on a much larger Brazilian harvest beginning midyear, will face a stagnant or slowly rising trend in world demand.

International Coffee Agreement

The International Coffee Council began its 34th session in London in September 1980. After nearly 3 weeks of discussion, coffee producers and consumers approved a package of measures to support world coffee prices. Among the major elements agreed on was the establishment of a global export quota of 57.37 million 60 kilogram bags, including 55.07 million for members entitled to a basic quota, and 2.3 million for exporting members exempt from basic quotas.

Under the agreement, quotas are automatically adjusted pro rata to exporting members entitled to basic quotas at specified price levels

within a range of \$1.15 to \$1.55 per pound. Since the indicator price was below the \$1.35 midpoint of the range on October 3, a reduced quota of 56 million bags became effective immediately.

Other provisions of the agreement concerned entry into force on November 1, 1980, of a mandatory control system in order to insure compliance with the quotas. For some countries, such as the United States, the passage of implementing legislation for the establishment of a control system may take much longer since it requires congressional approval. U.S. congressional action should now be easier to obtain since, in exchange for an acceptable quota agreement, the Bogota group will phase out the market activities of its trading arm, Pancafe, over the next year.

Liquidation on Pancafe's coffee stocks, estimated at 1.5 to 2 million bags by some sources, is likely to have a depressing effect on prices, since they are additional to the annual ICO quotas.

COCOA

Short-term outlook

World cocoa bean production for the 1980-81 (October-September) crop year is forecast at 1.63 million metric tons, slightly above the record 1979-80 harvest of 1.61 million tons. Reflecting less favorable growing conditions, African production is expected to drop by over 3 percent, but this decline is expected to be offset by record crops in Brazil and Malaysia.

World cocoa bean grindings in 1981 are forecast to be well below production levels, thus indicating a buildup in world stocks for the fourth consecutive year. World stocks increased by an estimated 148,000 tons this year and a stock increase of 138,000 tons is in the offing for 1981. Continued use of cocoa substitutes and extenders, high sugar prices, and the economic slowdown in consuming countries are curtailing demand, despite declining cocoa prices.

Cocoa bean prices have been trending downward during 1980, reaching a low of 99.3 cents per pound during August, but recovering slightly in September and October. World price trends for cocoa are expected to remain bearish during the remainder of the year and into 1981, if current supply-demand projections are realized. However, retail prices for finished cocoa and chocolate products are not expected to ease in 1981, as a result of soaring sugar prices and higher manufacturing costs. Cocoa bean prices have averaged about \$1.18 per pound during January-October 1980, down from the annual 1979 average of \$1.44 and \$1.53 in 1978. Prices averaged a record \$1.72 per pound in 1977.

Producers and consumers met in Geneva October 27 to November 7, 1980 in efforts to negotiate a new International Cocoa Agreement. The old agreement terminated March 31, 1980 after receiving a 6-month extension from the original expiration date of September 30, 1979.

Longer term outlook

World cocoa bean production is expected to trend upward during the 1980's reflecting expansionary programs by the Ivory Coast, Brazil, and Malaysia. The high price levels experienced during the mid and late 1970's have stimulated new plantings, which will be coming into bearing and reaching full productivity during this decade. As it

takes 4 to 5 years for new trees to come into production, supplies up to 1985 will largely come from plantings already made.

However, the price decline experienced this year has made the Ivory Coast Government take a second look at its efforts to promote cocoa expansion. But a great deal of the proposed new plantings are already in place and the many programs in effect would be difficult to reverse at this time, so that production trends are expected to continue their present path in the coming years.

Brazil's rate of new plantings is running behind schedule, but production levels in the 1980's are expected to rise considerably from the current 300,000-tons output. Much of this expansion will come from replanting and rehabilitation of the traditional producing areas.

Malaysia is expanding output and is fast becoming a major cocoa influence in the world market. Growers have found it to be quite profitable to intercrop cocoa with coconut, thus yielding a double return from the same land area.

However, on the negative side of the supply picture, unless sweeping measures are taken by the Governments of Ghana and Nigeria, their future cocoa bean crops will remain near the current depressed levels. Both Cameroon and Ecuador seem to have a limited potential to expand output, as the high level of rainfall in the cocoa regions of these countries causes significant losses from pod rot.

In looking ahead for cocoa demand during this decade, we can see ever increasing competition from cocoa substitutes and extenders. High world cocoa prices of the past several years have encouraged manufacturers to seek alternate products to keep their cost down. Once manufacturers have altered their formulas and have received consumer acceptance, they often are reluctant to revert back to old methods which utilize more cocoa.

The outlook for cocoa consumption has been clouded by soaring sugar prices and the poor economic outlook for many major consuming countries. World consumption in 1981 is expected to fall short of production for the fourth consecutive year, resulting in another sizable stock increase. With world production increasing and demand being flat, ample cocoa supplies seem to be in the offing, at least for the next several years.

More detailed information concerning the world cocoa situation can be found in Foreign Agriculture Circular FCB 3-80, November 1980.

TEA

World tea production in 1980 is forecast at a record 1.81 million metric tons, 2.6 percent greater than the 1979 harvest of 1.77 million tons. The Chinese Government has recently begun issuing tea statistics, and these data are now being incorporated into global FAS estimates. Although drought conditions during the early months of 1980 have adversely affected production in Sri Lanka, Kenya, and the U.S.S.R., good growing conditions have prevailed in India, with the crop expected to be at a record level this year. Larger crops are also forecast for China, Bangladesh, and Turkey.

World tea exports in 1979 totaled a record 822,000 tons and shipments are expected to rise further this year, reflecting the bumper world crop and China's expansion in export markets.

World tea prices have been relatively stable over the past 2 years,

reflecting the close balance between global supply and demand. However, high world sugar prices could curtail consumption, and with a record crop being harvested this year, stocks may increase and prices weaken in the coming months. Indications are that U.S. tea imports and sales will be higher in 1980. U.S. imports for the first 8 months of 1980 are running nearly 18 percent ahead of the similar period a year ago and tea sales by retail stores will likely exceed the 1979 level, as iced tea usage has increased because of the unusually hot summer.

World tea production in the coming decade will continue to increase, put most likely at a decreasing rate. As land availability for tea decreases, larger crops must come from higher inputs of fertilizers and pesticides, and from replanting with new high-yielding varieties. As tea requires about 3 to 4 years to come into production, supplies up to 1985 will mostly have to come from bushes already planted.

Tea is facing increased competition—especially in developed nations—from coffee, soft drinks, and related beverages. But excluding water, tea is the least expensive drink available and the most popular beverage in developing nations. However, the high price of sugar may curtail consumption somewhat over the near term.

Producing countries claim that higher returns are necessary to enable them to meet climbing production costs. Thus, efforts are being continued by several major producers to establish an International Tea Agreement. However, many African producers are still reluctant to support an agreement until they have completed their tea expansion programs and have secured a larger share of the world market.

Although no precise data are available for calculating the global supply-demand position for tea, it is generally believed that this relationship has been in relatively close balance for several years and that this situation will likely continue in the future.

More detailed information concerning the world tea situation can be found in Foreign Agriculture Circular FTEA 5-80, October 1980.

CENTRIFUGAL SUGAR: PRODUCTION IN SPECIFIED COUNTRIES

[In 1,000 metric tons, raw value]

Continent and country	1978-79		1979-80		1980-81	
	Beet	Cane	Beet	Cane	Beet	Cane
North America:						
Barbados	117		135		135	
Belize	100		105			103
Canada	125		105		115	
Costa Rica	195		191			204
Cuba	7,500		6,400			6,000
Dominican Republic	1,166		1,090			1,200
El Salvador	277		179			190
Guadeloupe	107		99			95
Guatemala	376		400			487
Haiti	65		66			70
Honduras	167		187			221
Jamaica	291		245			225
Martinique	16		15			14
Mexico	3,058		2,763			2,900
Nicaragua	212		179			227
Panama	228		180			250
St. Kitts	40		35			40
Trinidad and Tobago	144		114			110
United States—Continental (beet)	2,984		2,612		2,722	
United States—Continental (cane)		1,436		1,488		1,488
United States—Hawaii	962		962			965
United States—Puerto Rico		175		159		160
Total, North America	3,109	16,632	2,717	14,992	2,837	15,084
Total, beet and cane	19,741		17,709		17,921	

CENTRIFUGAL SUGAR: PRODUCTION IN SPECIFIED COUNTRIES—Continued

[In 1,000 metric tons, raw value]

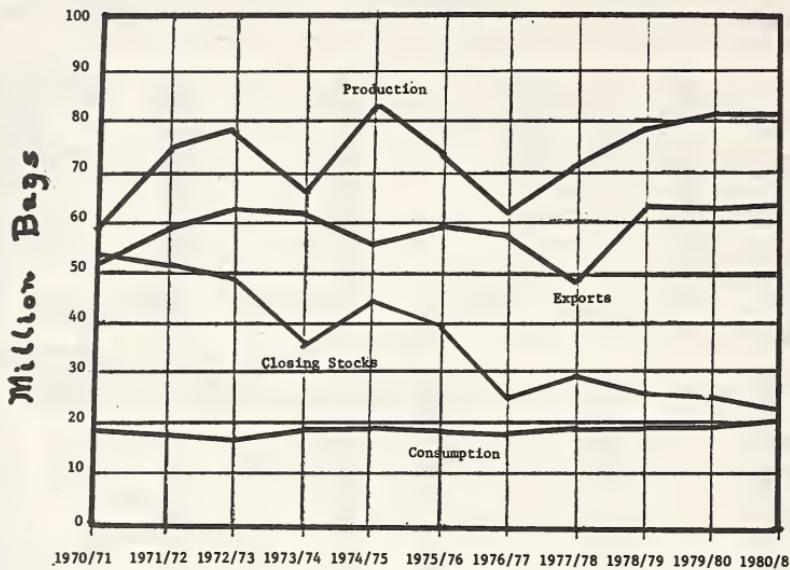
Continent and country	1978-79		1979-80		1980-81	
	Beet	Cane	Beet	Cane	Beet	Cane
South America:						
Argentina	1,387	—	1,395	—	1,650	—
Bolivia	314	—	289	—	296	—
Brazil	7,740	—	6,968	—	8,200	—
Chile	99	62	—	—	200	—
Colombia	1,019	—	1,193	—	1,223	—
Ecuador	353	—	357	—	378	—
Guyana	316	—	280	—	200	—
Paraguay	72	—	80	—	80	—
Peru	715	—	550	—	500	—
Surinam	11	—	12	—	12	—
Uruguay	93	—	71	—	76	—
Venezuela	325	—	350	—	380	—
Total, South America	99	12,345	62	11,545	200	13,067
Total, beet and cane	12,444	—	11,607	—	13,267	—
Western Europe:						
European Community:						
Belgium and Luxembourg	834	—	965	—	905	—
Denmark	435	—	485	—	447	—
France	4,000	—	4,237	—	4,280	—
Germany, West	2,997	—	3,088	—	2,850	—
Ireland	201	—	187	—	180	—
Italy	1,605	—	1,672	—	1,660	—
Netherlands	1,019	—	913	—	885	—
United Kingdom	1,111	—	1,255	—	1,230	—
Total, European Community	12,202	—	12,802	—	12,437	—
Austria	375	—	429	—	457	—
Finland	104	—	100	—	113	—
Greece	348	—	313	—	198	—
Portugal:						
Azores (beet)	8	—	3	—	2	—
Madeira (cane)	—	2	—	1	—	1
Spain	1,101	5	697	4	921	—
Sweden	322	—	333	—	317	—
Switzerland	105	—	116	—	96	—
Total, Western Europe	14,565	7	14,793	5	14,541	3
Total, beet and cane	14,572	—	14,798	—	14,544	—
Eastern Europe:						
Albania	21	—	21	—	20	—
Bulgaria	240	—	305	—	275	—
Czechoslovakia	875	—	950	—	900	—
German Democratic Republic	820	—	861	—	750	—
Hungary	530	—	550	—	475	—
Poland	1,736	—	1,557	—	1,190	—
Romania	555	—	525	—	500	—
Yugoslavia	765	—	801	—	722	—
Total, Eastern Europe	5,542	—	5,570	—	4,832	—
Total, beet and cane	5,542	—	5,570	—	4,832	—
Total, Europe	20,107	7	20,363	5	19,373	3
Total, beet and cane	20,114	—	20,368	—	19,376	—
USSR (Europe and Asia)	9,300	—	7,400	—	7,400	—

CENTRIFUGAL SUGAR: PRODUCTION IN SPECIFIED COUNTRIES—Continued

[In 1,000 metric tons, raw value]

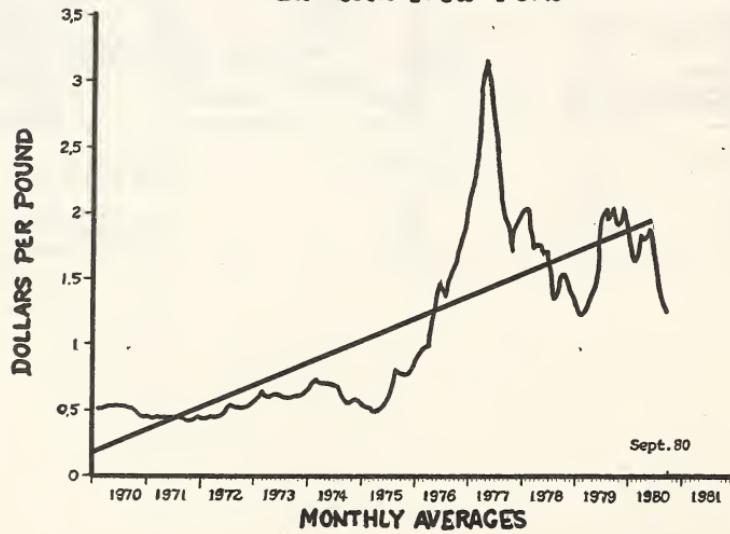
Continent and country	1978-79		1979-80		1980-81	
	Beet	Cane	Beet	Cane	Beet	Cane
Africa:						
Angola	39	—	40	—	40	—
Egypt	668	—	662	20	675	—
Ethiopia	165	—	170	—	170	—
Kenya	255	—	317	—	432	—
Madagascar	112	—	115	—	115	—
Mauritius	705	—	730	—	500	—
Morocco	375	—	339	—	340	—
Mozambique	175	—	175	—	175	—
Reunion	311	—	288	—	276	—
Zimbabwe	309	—	299	—	310	—
South Africa, Republic of	2,209	—	2,206	—	1,721	—
Swaziland	261	—	255	—	331	—
Tanzania	136	—	130	—	130	—
Uganda	10	—	12	—	10	—
Zaire	51	—	51	—	50	—
Other Africa	35	503	39	690	39	958
Total, Africa	35	6,284	39	6,479	59	6,233
Total, beet and cane	6,319	—	6,518	—	6,292	—
Asia:						
Bangladesh	148	—	101	—	169	—
Burma	130	—	135	—	135	—
China, Mainland	332	2,343	422	2,343	500	2,300
China, Taiwan	891	—	890	—	890	—
India	7,071	—	5,213	—	6,917	—
Indonesia	1,160	—	1,307	—	1,403	—
Iran	650	—	613	—	600	—
Japan	401	292	504	240	505	260
Pakistan	33	620	32	539	32	693
Philippines	2,347	—	2,325	—	2,420	—
Thailand	1,851	—	1,087	—	1,350	—
Turkey (Europe/Asia)	1,079	—	1,052	—	1,000	—
Other Asia	79	299	92	204	65	208
Total, Asia	1,924	17,802	2,102	14,997	2,102	17,345
Total, beet and cane	19,726	—	17,099	—	19,447	—
Oceania:						
Australia	2,978	—	3,027	—	3,300	—
Fiji Islands	347	—	473	—	500	—
Total, Oceania	3,325	—	3,500	—	3,800	—
Total, beet and cane	3,325	—	3,500	—	3,800	—
World total (beet)	34,574	—	32,683	—	31,971	—
World total (cane)	56,395	—	51,518	—	55,532	—
World total (beet and cane)	90,969	—	84,201	—	87,503	—

Coffee
 Production, Consumption, Exports, Closing Stocks
 1970/71 - 1980/81 ^{1/}



^{1/} In Producing Countries only.

Coffee
 Other Milds Arabicas
 Ex-dock New York



COCOA BEANS: PRODUCTION IN SPECIFIED COUNTRIES, 1975/76—1980/81

[In thousands of metric tons]

Region and country	1975/76	1976/77	1977/78	1978/79	1979/80	¹ Forecast 1980/81
North America:						
Costa Rica	7.2	9.4	9.0	9.0	5.0	8.0
Cuba	2.0	2.0	2.0	2.0	2.0	2.0
Dominican Republic	29.0	31.0	30.0	34.0	29.0	32.0
Grenada	2.9	2.1	2.3	2.3	2.3	2.0
Guatemala	2.0	3.0	3.5	3.5	3.5	3.5
Haiti	3.0	3.0	3.0	3.0	2.8	2.5
Honduras	.3	.3	.3	.3	.3	.3
Jamaica	1.6	1.6	1.3	1.8	1.8	1.7
Mexico	33.1	24.2	34.7	36.0	36.0	38.0
Nicaragua	.6	.5	.6	.3	.4	.4
Panama	.5	.5	.5	.5	.5	.5
Trinidad and Tobago	2.4	4.0	3.6	3.5	3.5	3.5
Other ²	.4	.4	.4	.4	.4	.4
Total	85.0	82.0	91.2	96.6	87.5	94.8
South America:						
Bolivia	3.0	3.1	3.2	2.8	3.0	3.0
Brazil	257.4	234.0	283.0	314.0	290.0	325.0
Colombia	27.5	30.5	31.5	32.3	33.5	35.0
Ecuador	58.6	72.5	78.0	88.0	96.8	96.0
Peru	3.4	4.6	5.7	6.8	7.0	7.0
Surinam	.1	.1	.1	.1	.1	.1
Venezuela	16.0	16.6	16.7	15.1	13.0	16.7
Total	366.0	361.4	418.2	459.1	443.4	482.8
Africa:						
Angola	.1	.2	.2	.2	.2	.2
Cameroon	96.0	84.5	108.2	107.0	122.0	120.0
Comoro Islands	.1	.1	.1	.1	.1	.1
Congo	2.4	2.5	2.5	2.5	2.5	2.5
Equatorial Guinea	11.0	5.0	5.0	8.0	4.5	5.0
Gabon	3.7	3.5	3.2	4.4	4.0	3.5
Ghana	400.3	324.3	271.3	265.0	295.0	280.0
Ivory Coast ³	231.1	232.4	303.6	312.0	360.0	360.0
Liberia	2.8	3.1	3.5	3.5	3.5	3.0
Madagascar	1.7	1.7	1.9	1.8	1.8	1.8
Nigeria ⁴	217.9	167.3	205.6	139.0	175.0	160.0
Sao Tome and Principe	6.0	4.7	7.0	7.5	7.0	7.0
Sierre Leone	6.1	7.3	6.7	7.2	11.0	9.0
Tanzania	.8	.8	.8	.7	.7	.7
Togo ³	17.8	15.5	16.0	14.0	14.0	14.0
Uganda	.1	.1	.2	.1	.1	.1
Zaire	4.3	4.1	4.7	4.0	4.0	4.0
Total	1,002.2	857.1	940.5	877.0	1,005.4	970.9
Asia and Oceania:						
Fiji Islands	.1	.1	.1	.1	.1	.1
Indonesia	3.7	4.6	4.0	6.0	6.2	7.0
Malaysia	15.4	17.3	22.0	27.8	33.5	40.0
New Herbrides	.5	.8	1.0	.6	.9	.8
Papua New Guinea	31.3	27.8	29.1	27.0	30.0	30.0
Philippines	3.2	2.9	3.1	3.3	3.4	3.4
Solomon Islands	.1	.1	.2	.2	.2	.2
Sri Lanka	1.9	1.8	1.3	1.5	1.5	1.5
Western Samoa	2.1	1.4	1.3	1.3	1.5	1.5
Total	58.3	56.8	62.1	67.8	77.3	84.5
Grand total	1,511.5	1,357.3	1,512.0	1,500.5	1,613.6	1,633.0

¹ Estimates refer to an October-September crop year.² Includes Dominica, St. Lucia, Guadeloupe, and Martinique.³ Includes some cocoa marketed from Ghana.⁴ Includes cocoa market through Benin.

Source: Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source material, reports of agricultural attachés and Foreign Service officers, results of office research and related information.

WORLD COCOA BEAN SUPPLY—DEMAND AND APPARENT STOCK CHANGE, 1949/50—1980/81

[In thousand metric tons: cents per pound]

October-September season	Production ¹			Apparent	New York spot
	Gross	Net	Grind ²	stock change	Accra cocoa bean prices ³
1949/50	768	760	789	-29	29.0
1950/51	806	798	756	+42	36.7
1951/52	647	641	726	-85	35.2
1952/53	809	801	809	-8	34.2
1953/54	786	778	744	+34	56.5
1954/55	786	778	731	+47	41.4
1955/56	836	828	837	-9	28.8
1956/57	898	889	919	-30	27.2
1957/58	761	753	858	-105	43.5
1958/59	899	890	874	+16	38.0
1959/60	1,043	1,033	931	+102	29.9
1960/61	1,164	1,152	1,026	+126	23.5
1961/62	1,125	1,114	1,120	-6	21.9
1962/63	1,162	1,150	1,154	-4	23.9
1963/64	1,239	1,227	1,194	+33	24.1
1964/65	1,491	1,476	1,340	+136	18.4
1965/66	1,220	1,208	1,388	-180	23.1
1966/67	1,336	1,323	1,386	-63	27.5
1967/68	1,352	1,338	1,410	-72	30.9
1968/69	1,236	1,224	1,353	-129	45.1
1969/70	1,423	1,409	1,355	+54	37.3
1970/71	1,493	1,478	1,438	+40	29.2
1971/72	1,572	1,556	1,565	-9	29.0
1972/73	1,406	1,392	1,556	-164	55.5
1973/74	1,458	1,443	1,478	-35	91.2
1974/75	1,542	1,527	1,462	+65	82.7
1975/76	1,511	1,496	1,525	-29	92.0
1976/77	1,357	1,343	1,361	-18	189.8
1977/78	1,512	1,497	1,387	+110	⁴ 147.7
1978/79	1,500	1,485	1,426	+59	154.3
1979/80	1,614	1,598	1,450	+148	123.5
1980/81 forecast	1,633	1,617	1,480	+137	-----

¹ FAS data. An adjustment of 1 percent for loss in weight is made to arrive at a net production figure.² Gill & Duffus data. Calendar year grind, refers to last year of crop year.³ Average for October-September year.⁴ Beginning October 1977, all price data refer to the average of the daily closing price of the nearest 3 active futures trading months on the New York market.

Source: Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source material, reports of agricultural attaches and Foreign Service officers, results of office research and related information.

COCOA BEAN GRINDINGS BY SPECIFIED COUNTRIES, BY QUARTERS, 1972-80

[In metric tons]

Quarter	1972	1973	1974	1975	1976	1977	1978	1979	1980
United States:									
1st-----	79,289	77,883	67,586	43,727	60,873	56,473	42,048	40,572	33,478
2d-----	66,134	73,437	58,786	51,529	54,976	46,902	38,420	41,359	30,837
3d-----	63,231	60,691	54,477	53,207	55,021	40,914	36,923	41,401	34,877
4th-----	80,377	67,087	48,671	59,330	54,477	39,463	45,269	36,970	-----
Total -----	289,031	279,098	229,520	207,793	225,347	183,752	162,660	160,302	-----
West Germany:									
1st-----	34,429	41,030	37,104	40,088	36,221	38,297	39,770	37,592	40,240
2d-----	32,569	39,507	31,773	34,049	35,187	32,315	34,724	34,819	35,405
3d-----	31,591	33,809	30,766	29,990	30,615	30,494	30,308	30,337	32,937
4th-----	40,223	38,019	38,531	34,839	38,612	41,187	38,847	39,506	-----
Total -----	138,812	152,365	138,174	138,966	140,635	142,293	143,649	142,254	-----
Netherlands:									
1st-----	31,880	33,230	33,430	33,270	34,570	34,940	33,990	35,390	35,080
2d-----	31,050	31,130	28,030	27,410	31,760	31,980	31,480	29,280	31,370
3d-----	28,450	26,260	23,020	26,500	25,900	26,610	26,680	29,760	-----
4th-----	33,060	31,970	30,430	32,220	35,090	32,590	33,760	33,930	-----
Total -----	124,440	122,590	114,910	119,400	127,320	126,120	125,910	127,460	-----
United Kingdom:									
1st-----	22,048	29,059	27,738	20,219	22,300	22,000	21,010	17,700	15,500
2d-----	24,182	28,246	25,909	18,086	21,600	20,500	19,000	15,900	15,800
3d-----	24,182	23,877	21,439	15,444	17,900	16,400	15,900	12,300	-----
4th-----	27,332	25,808	17,984	18,797	21,200	16,400	16,500	14,700	-----
Total -----	97,744	106,990	93,070	72,546	83,000	75,300	72,410	60,600	-----
France:									
1st-----	10,960	14,540	11,055	9,730	10,125	10,725	10,815	11,530	12,525
2d-----	12,245	12,905	9,490	9,095	9,515	10,450	10,905	11,455	10,860
3d-----	10,130	8,670	7,400	6,925	7,190	7,455	7,330	8,820	-----
4th-----	14,700	11,140	8,970	8,585	8,830	7,685	10,940	11,365	-----
Total -----	48,035	47,255	36,915	34,335	35,660	36,315	39,990	43,170	-----
Belgium:									
1st-----	5,272	5,567	6,235	6,000	6,200	4,499	4,015	4,504	6,082
2d-----	4,565	4,787	4,846	4,800	5,200	3,795	3,528	3,552	-----
3d-----	4,589	4,592	4,427	4,700	4,100	4,437	3,131	3,179	-----
4th-----	5,897	6,084	6,456	3,800	3,300	4,111	4,723	5,312	-----
Total -----	20,323	21,030	21,964	19,300	18,800	16,842	15,397	16,547	-----
Switzerland:									
1st-----	4,364	5,275	4,703	3,961	3,915	4,407	3,699	3,096	5,300
2d-----	4,522	4,141	4,619	3,901	4,130	3,648	3,830	3,930	3,927
3d-----	4,112	4,250	3,492	3,462	3,832	4,305	3,409	2,862	-----
4th-----	5,478	4,274	3,919	3,404	4,095	3,809	3,364	4,077	-----
Total -----	18,476	17,940	16,733	14,728	15,972	16,169	14,302	13,965	-----
Japan:									
1st-----	7,775	9,555	7,871	5,789	7,117	7,024	4,175	4,837	5,851
2d-----	7,690	8,540	6,298	6,891	7,789	5,956	5,465	4,877	5,027
3d-----	9,888	9,715	7,568	8,140	8,707	6,725	5,727	6,073	-----
4th-----	10,759	10,136	7,870	8,369	8,848	6,014	5,764	6,598	-----
Total -----	36,112	37,946	29,607	29,189	32,461	25,719	21,131	22,385	-----
Canada:									
1st-----	4,568	4,700	4,784	2,561	3,515	3,483	2,801	2,871	-----
2d-----	4,779	4,017	4,089	2,855	3,095	2,888	2,373	2,801	-----
3d-----	3,752	3,988	3,202	2,214	2,434	2,011	2,164	1,913	-----
4th-----	5,809	5,139	3,458	3,239	3,828	3,029	3,245	-----	-----
Total -----	18,908	17,844	15,533	10,869	12,872	11,411	10,583	-----	-----
Australia:									
1st-----	3,475	3,440	3,711	3,556	3,741	3,676	3,123	2,570	2,797
2d-----	4,261	3,542	4,312	3,793	4,203	4,111	3,464	3,142	-----
3d-----	4,171	4,196	4,209	3,176	4,166	3,477	2,630	2,658	-----
4th-----	3,641	4,341	3,590	3,362	4,033	3,542	2,832	2,340	-----
Total -----	15,548	15,519	15,822	13,887	16,143	14,806	12,049	10,710	-----

Source: National statistics of the respective countries.

TEA: PRODUCTION IN SPECIFIED MAJOR PRODUCING COUNTRIES, AVERAGE, 1970-74, ANNUAL 1975 TO 1980

[In thousands of metric tons]

Continent and country	Average 1970-74	1975	1976	1977	1978	1979	Forecast 1980
Asia and Oceania:							
Bangladesh	25.5	29.0	33.3	38.0	38.0	35.9	42.0
China:							
Mainland	(1)	(1)	(1)	252.0	268.0	277.0	285.0
Taiwan	26.7	26.1	24.8	26.3	25.9	27.1	27.5
India	454.8	487.1	511.8	556.3	571.3	549.6	580.0
Indonesia	49.6	56.8	61.1	64.3	73.2	73.3	75.0
Iran	21.2	23.0	22.0	20.0	25.0	20.0	20.0
Japan	95.0	105.4	100.1	102.3	104.7	100.0	104.0
Malaysia	3.4	3.1	3.2	3.8	3.0	3.3	3.3
Papua New Guinea	2.9	5.0	6.2	6.5	7.0	7.0	7.1
Sri Lanka	211.8	213.7	196.6	208.6	199.0	206.4	200.0
Turkey	39.9	55.6	59.5	84.1	86.2	100.0	110.0
U.S.S.R.	72.5	86.3	92.0	106.4	111.2	115.0	110.0
Vietnam ²	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Total	3,100.8	3,109.1	3,111.6	1,473.6	1,517.5	1,519.6	1,568.9
Africa:							
Burundi	.5	.9	1.2	1.5	1.5	1.6	1.6
Cameroon	1.4	1.8	2.0	1.0	1.9	2.0	2.0
Kenya	48.1	56.7	62.0	86.3	93.4	99.3	90.0
Malawi	21.0	26.2	28.3	31.7	31.7	32.6	32.5
Mauritius ⁴	4.0	3.1	4.3	4.7	5.1	5.1	5.0
Mozambique	17.7	13.1	13.8	14.0	18.1	19.7	20.0
Rwanda	2.3	4.0	4.9	5.4	5.3	5.8	7.0
Tanzania	11.5	13.7	14.1	16.7	17.3	17.9	17.5
Uganda	18.3	18.4	15.4	15.2	10.9	1.5	4.0
Zaire	7.9	5.5	5.0	4.5	4.5	4.5	4.5
Zimbabwe	4.8	6.9	6.0	6.2	6.9	9.8	10.0
Total	137.5	150.3	157.0	187.2	196.6	199.8	194.1
South America:							
Argentina	24.0	29.0	33.0	33.5	30.0	33.0	35.0
Brazil	6.4	6.5	7.0	7.0	9.0	10.0	10.0
Ecuador	.6	1.0	1.2	1.3	1.5	1.5	1.5
Peru	2.0	2.2	2.5	2.5	2.5	3.0	3.0
Total	33.0	38.7	43.7	44.3	43.0	47.5	49.5
Grand total	3,1179.3	3,1285.1	3,1316.3	1,705.1	1,757.1	1,766.9	1,812.5

¹ Data not available prior to 1977. Data for 1977-79 are official Chinese Government estimates.² Production refers to south region only.³ Totals exclude Mainland China.⁴ Year ending June 30.

Source: Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source material, reports of agricultural attaches and Foreign Service officers, results of office research and related information.

CORN SWEETENER OUTLOOK

(By Stephen Vuilleumier, McKeany-Flavell Co., Inc.)

It is a pleasure to address the annual USDA Outlook Conference on the subject of corn sweeteners.

Today, corn sweeteners represent over 33 percent of the country's 28.9-billion-pound nutritive sweetener market, compared with only 10 percent in 1960. Over 1.4 million bushels of corn per day are processed into corn sweeteners. The U.S. corn refiner grind will likely total a record 470 million bushels in calendar year 1980. About 70 percent of the starch produced by the wet milling industry is utilized to make corn sweeteners, with the balance remaining as starch. The corn refining industry is the third largest user of our corn crop. Domestic feeds are first and exports second.

There are basically four types of corn sweeteners:

CONVENTIONAL CORN SYRUPS

This product has been available for years. Corn syrups add body, sweetness, and texture to products, and because they are hygroscopic, hold moisture well. They are used in such products as ice cream, candy, canned foods, and baked goods.

CORN SYRUPS SOLIDS

These powdered sweeteners are made by drying corn syrups and are used by food manufacturers in such products as dehydrated soups and dried eggs.

During the 1970's, all corn syrup deliveries for food used increased 4 percent per year. The table I projections are made for corn syrup deliveries in 1985. An annual increase of 2 percent was assumed.

DEXTROSE

Dextrose is produced in both dry and liquid form. Sweetness and bland flavor make it ideal in such products as baked goods, peanut butter, and icings. Deliveries have remained flat over the last decade. Declining deliveries to the soft drink and baking industries have been offset by increased usage for chemical applications and light beer. Delivery projections in table I assume a 2-percent annual growth rate. Per capita consumption should remain relatively flat.

HIGH FRUCTOSE CORN SYRUP

There are currently available three types of HFCS.

Forty-two percent HFCS.—This liquid sweetner is made of 42 percent fructose, 52 percent dextrose, and 6 percent higher saccharides. Primary use is in the beverage, baking, and canning industries.

Fifty-five percent HFCS.—Contains 55 percent fructose, 40 percent dextrose, and 5 percent higher saccharides. The beverage industry accounts for the majority of second generation shipments.

Ninety percent HFCS.—Sales of 90 percent HFCS are very limited, mostly to the health food industry. The product is 90 percent fructose, 7 percent dextrose, and 3 percent higher saccharides.

Table I shows sweetener deliveries over the 1970-80 period with projections to 1985. Corn sweeteners' share of the nutritive sweetener market increased from 16 percent in 1970 to an expected 33 percent in 1980, and may rise to 48 percent by 1985.

TABLE I.—1970-85 NUTRITIVE SWEETENER DELIVERIES

[In millions of dry pounds]

Year	Sucrose	Corn syrup	HFCS	Dextrose	Total corn	Total sweetener	Percent corn
1970	20,866	2,870	150	940	3,960	24,826	16
1971	21,206	3,110	190	1,040	4,340	25,546	17
1972	21,472	3,260	264	920	4,444	25,916	17
1973	21,362	3,510	436	1,010	4,956	26,318	19
1974	20,458	3,690	634	1,040	5,364	25,822	21
1975	19,256	3,780	1,062	1,090	5,932	25,188	24
1976	20,360	3,810	1,578	1,100	6,488	26,848	24
1977	20,746	3,880	2,076	910	6,866	27,612	25
1978	20,354	3,960	2,692	850	7,502	27,856	27
1979	20,104	4,010	3,402	860	8,272	28,376	29
1980	19,300	4,150	4,300	877	9,327	28,627	33
1981	18,528	4,233	5,350	895	10,478	29,006	36
1982	17,787	4,318	6,500	913	11,731	29,518	40
1983	17,075	4,404	7,200	931	12,535	29,610	42
1984	16,392	4,492	8,000	950	13,442	29,834	45
1985	15,737	4,582	8,700	968	14,250	29,987	48

Note: The above figures are for human consumption only.

Source: 1970-79 figures USDA. 1980-85 HFCS projections based on "Sweetener Outlook," Donaldson, Lufkin & Jenrette, June 1980 with adjustments. 1980-85 sucrose figures assume a 4 percent annual decline due to corn sweetener market penetration. 1980-85 corn syrup and dextrose figures assume a 2 percent annual increase.

Table II contains estimates of per capita consumption of nutritive sweeteners. Sucrose is expected to continue the downtrend prevalent during the 1970's. By 1985, per capita sucrose usage could drop below 70 pounds from 103 pounds in 1970. Corn sweeteners could approach 63 pounds per capita in 1985, up from 19.5 pounds 10 years ago.

TABLE II.—1970-85 PER CAPITA NUTRITIVE SWEETENER DELIVERIES (DRY POUNDS)

Year	Sucrose	Corn syrup	HFCS	Dextrose	Total corn	Total sweetener	Percent corn
1970	103.2	14.2	0.7	4.6	19.5	122.7	15.9
1971	103.4	15.2	.9	5.0	21.1	124.5	16.9
1972	103.7	15.7	1.3	4.4	21.4	125.1	17.1
1973	102.4	16.8	2.0	4.8	23.6	126.0	18.7
1974	97.3	17.5	3.0	4.9	25.4	122.7	20.7
1975	90.9	17.8	5.0	5.1	27.9	118.8	23.5
1976	95.4	17.9	7.4	5.2	30.5	125.9	24.2
1977	96.5	18.0	9.6	4.2	31.8	128.3	24.8
1978	93.8	18.2	12.4	3.9	34.5	128.3	26.9
1979	91.9	18.3	15.5	3.9	37.7	129.6	29.1
1980	87.6	18.8	19.5	4.0	42.3	129.9	32.6
1981	83.4	19.1	24.0	4.0	47.1	130.5	36.1
1982	79.5	19.3	29.0	4.0	52.3	131.8	39.7
1983	75.7	19.5	31.9	4.1	55.5	131.2	42.3
1984	72.1	19.8	35.2	4.1	59.1	131.2	45.0
1985	68.7	20.0	38.0	4.2	62.2	130.9	47.5

Source: McKeany-Flavell Co., Inc., 1980-85 projections based on Bureau of the Census data,

During the 1970's, HFCS accounted for about 80 percent of the wet milling industry sweetener volume growth. HFCS should continue to represent the lion's share of projected growth. For this reason it is discussed in depth.

This year industry sales of HFCS are projected at 4.3 billion pounds dry basis which is equivalent to 2,300,000 S.T. raw value, a 26 percent increase from 1979. From its commercial inception, HFCS usage was generally limited to first generation product. However, the last 2 years have seen a significant increase in second generation 55 percent product usage. Table III shows the changing market mix between first and second generation product for 1978 and 1980 with a projection for 1985.

TABLE III.—ESTIMATED HFCS DELIVERIES BY PRODUCT: 1978, 1980, 1985

[In millions of dry pounds]

	1978	HFCS percent total	1980	HFCS percent total	1985	HFCS percent total
Product type:						
42 percent-----	2,400	89	2,900	67	3,600	41
55 percent-----	300	11	1,400	33	5,100	59
Total-----	2,700	100	4,300	100	8,700	100

¹ Estimated from public information.

Deliveries of 42 percent are projected to increase 4 percent annually between 1980 and 1985. This indicates a mature market. By 1985, sales of 42 percent HFCS could approach 3.6 billion pounds dry and second generation product is projected over 5 billion pounds, up from approximately 1.5 billion pounds this year. In 5 years, second generation product may represent well over half of HFCS deliveries compared with 33 percent this year.

Taste tests have shown second generation product to be about 10 percent sweeter than first generation. In addition HFCS 55 percent has higher solids, lower dextrose, and a more favorable polysaccharide content. These characteristics have allowed it to compete successfully as a replacement for medium invert sugar, historically the major sweetener used by the soft drink industry.

Several significant developments occurred for the HFCS industry this year. On January 25, 1980, the Coca-Cola Co. approved 50 percent replacement of refined sugar by HFCS 55 percent. In March, Pepsi-Cola approved 50 percent replacement of refined sugar by HFCS 55 percent in Pepsi-Cola fountain syrup. During September, the Seven-Up Co. approved 100 percent replacement of refined sugar by second generation product in Seven-Up and in October, the Dr. Pepper Co. approved 100 percent replacement of refined sugar by second generation product. It is estimated over 2 billion dry pounds of approved HFCS substitution exist in soft drinks above current usage levels.

The following are estimates of HFCS market share:

MAJOR MARKETS FOR HFCS

	HFCS estimated market share (percent) ¹	
	1980	1985
Beverages—carbonated and noncarbonated	51	67
Baking—yeast raised products	20	12
Canning	15	11
Dairy products	9	5
Processed foods including jams, preserves	5	4
Confections	½	1

¹ Estimated from public information.

If the above projections prove accurate, by 1985, between 65 percent and 70 percent of HFCS deliveries will be to the beverage industry. In order to evaluate HFCS penetration of the nutritive sweetener market, estimates were made in table IV of industrial sugar and HFCS deliveries for 1980. Current HFCS market share is compared with a long-term theoretical penetration level.

TABLE IV.—1980 ESTIMATED SUGAR AND HFCS DELIVERIES BY MARKET

[In millions of dry pounds]

	Sugar	HFCS	HFCS percent sweetener market	Long-term theoretical penetration percent
Beverages	4,920	2,200	31	90
Baking	2,500	850	25	25
Canning	970	650	40	60
Dairy products	950	380	29	30
Processed foods	920	200	18	40
Confections	1,800	20	1	5
Total industrial	12,060	4,300	26	-----

Source: McKeany-Flavell Co., Inc., projections from "High Fructose Syrups: The Competition to Sugar," Donald Nordund, A. E. Staley Manufacturing Co., February 1980, with adjustments.

From table IV we see the beverage industry offers the greatest potential for increased penetration followed by the canning and processed food industries.

To carry this analysis one step further, table V projects HFCS deliveries by major industry between 1980 and 1985.

TABLE V.—ESTIMATED 1980-85 HFCS DELIVERIES BY MARKET

[In millions of dry pounds]

	1980	1981	1982	1983	1984	1985
Beverages	2,200	3,060	3,985	4,565	5,190	5,855
Baking	850	910	995	1,015	1,095	1,100
Canning	650	710	775	840	910	920
Dairy products	380	410	440	445	450	455
Processed foods	200	235	275	295	305	315
Confections	20	25	30	40	50	55
Total	4,300	5,350	6,500	7,200	8,000	8,700

Source: McKeany-Flavell Co., Inc., projections from "Sweetener Outlook," Donaldson, Lufkin & Jenrette, June 1980 with adjustments.

Between 1980 and 1985, HFCS deliveries are projected to increase by 4.4 billion pounds. The soft drink industry should account for approximately 85 percent of the increase. Nonsoft drink industries seem to be reaching saturation, except for canning and processed foods. Further growth could be limited to population and normal per capita increases.

Due to the accelerated demand and sales potential for HFCS 55 percent over the last year, approximately eight corn wet millers have announced plans to expand production capacities by enlarging or changing the mix of existing facilities and/or building new plants. The following table estimates theoretical HFCS capacities by company plant location. Please note capacity estimates do not represent product availability. Some production is not onstream at this time and some HFCS capacity could be used to manufacture other corn derived products.

Table VI indicates approximately 90 percent of the 1981-83 expansion is for second generation 55 percent product. The composition of industry capacity is moving toward a more even distribution between first and second generation product. In 1980, second generation product represents approximately 27 percent of total capacity. By 1983, second generation product could represent over 50 percent.

A discussion of corn sweeteners would not be complete without considering the implications of ethanol production.

The U.S. Government has encouraged the production of ethanol as a motor fuel extender. Gasohol, a blend of 10 percent alcohol and 90 percent gasoline, is becoming increasingly popular as a way to reduce internal consumption of imported oil. Archer Daniels Midland Co. is the largest wet miller producing industrial alcohol for gasohol. By the end of 1981, they expect to have a capacity to produce 260 million gallons annually. CPC and Texaco are in the process of converting CPC's Pekin, Ill., wet milling plant into an alcohol plant with an annual capacity of 60 million gallons. A. E. Staley announced it expects to produce 40 million gallons annually at its new wet milling plant at Loudon, Tenn. At least two other companies involved in the wet milling industry have announced future power alcohol production plans. National Distillers announced last month a major project to produce alcohol from corn by a new method of fermentation. A new plant will be completed by 1983 to produce 50 million gallons annually of ethanol to make gasohol. The plant will use a new "continuous" fermentation method.

1979 gasoline sales were in the 110 billion gallon range. The gasohol market potential is about 10 percent or 11 billion gallons. Realistically 500 to 700 million gallons of alcohol may be used for gasohol in the 1983-85 period. This would represent one-half percent of the gasoline market or a 5-percent penetration of the gasohol market.

TABLE VI.—ESTIMATED THEORETICAL HFCS CAPACITIES
[In millions of dry pounds; percent]

	Additional capacity expected							
	1980		1981		1982		1983	
	42	55	42	55	42	55	42	55
1. American Maize: Decatur, Ala.	250	—	(50)	—	350	—	—	—
2. Amstar: Dimmitt, Tex.	250	—	—	—	200	—	—	—
3. Anheuser-Busch: Lafayette, Ind.	75	—	—	—	—	—	—	—
4. ADM/Corn Sweeteners: Cedar Rapids, Iowa	350	400	350	—	—	—	—	—
Decatur, Ill.	750	—	(450)	—	850	—	—	—
5. CPC: Argo, Ill.	310	—	—	—	150	—	—	—
Stockton, Calif.	—	—	235	—	—	—	—	—
Winston-Salem, N.C.	—	—	—	—	95	100	—	—
6. Cargill: Dayton, Ohio	260	—	(50)	260	—	—	160	280
Memphis, Tenn.	—	—	—	—	—	—	—	—
7. Clinton: Clinton, Iowa	370	300	—	—	—	—	—	—
Montezuma, N.Y. ¹	300	—	(150)	—	135	—	—	—
8. Great Western: Johnstown, Colo.	30	70	—	—	—	—	80	320
Reserve, La.	—	—	—	—	—	—	—	—
9. Hubinger: Keokuk, Iowa	320	170	—	—	—	—	—	—
10. Holly Sugar: Tracy, Calif.	100	—	—	—	—	—	—	—
11. A. E. Staley: Decatur, Ill.	420	—	—	—	—	—	—	—
Lafayette, Ind.	—	620	—	—	300	—	—	—
Loudon, Tenn.	—	—	—	—	—	—	—	460
Morrisville, Pa.	350	—	—	270	—	—	—	—
Total ²	4,135	1,560	(115)	2,365	405	380	80	780
Cumulative totals	4,135	1,560	4,020	3,925	4,425	4,305	4,505	5,085

¹ Assumes 50 percent distribution between 42 and 55 percent production for 1981.

² Using 1980 as a base year. 1981-83 figures estimate capacity changes.

Sources: Theoretical estimates from press releases, security analyst reports, periodicals, and other public sources.

The production of gasohol and the eventual size of the market will depend on Government incentives for production, the development of the synthetic fuels program and the economics involved. Due to the immense size of the market and Government willingness to provide incentives, it would appear fuel alcohol production will be attractive, especially for the wet milling industry.

Some of the wet milling industry ethanol production may be derived from excess seasonal grind capacity, less desirable production lines and marginal grind capacity. Costs for the wet milling industry should be attractive compared with those who build freestanding alcohol plants. It appears many new wet milling plant are being constructed to allow for the production of ethanol along with corn sweeteners and one should expect this practice to continue. Thank you very much.

WORLD MEAT OUTLOOK: DEMAND PERSPECTIVES

(By James E. Nix, World Food and Agricultural Outlook and Situation Board,
U.S. Department of Agriculture)

Meat production for both the United States and the World¹ will reach record-high levels in 1980. But several developments around the world this year do not favor the livestock and poultry industries. Poor growing and harvesting conditions in several countries led to reduced concentrate feed production and caused poor grazing conditions.

These reduced feed supplies are causing a sharp increase in the cost of feedstuffs. Higher feed prices, combined with the rising cost of other inputs, are putting livestock and poultry producers in many countries in a severe cost-price squeeze. This will result in a downward adjustment in total meat production during 1981 in some countries, including the United States.

Demand for meat in some countries is being adversely affected by poor economic growth. This is serving to hold down meat prices and further contributes to the cost-price squeeze on producers. Demand in some countries, however, continues to be strong and per capita meat consumption remains on the rise.

WORLD PRODUCTION

World meat production will probably rise again in 1981 despite reduced feed production in sharply higher cost of feeds. Production rose this year as the increase in the output of meats other than beef more than offset a decline in beef production. The production mix will likely shift in 1981, however, as beef and veal production begins to increase, poultry output continues to rise, and pork production slips. Production of lamb, mutton, and goat meat probably will not change much.

Beef and veal production to rise

After slipping lower every year since 1977, world production of beef and veal may rise in 1981. As in the United States, cattle herds are being rebuilt in many countries. Cattle inventories at the beginning of 1981 are expected to be larger than a year earlier in the United States and Canada while the herd in Mexico shows very little change. This should result in an increase in North American beef production during 1981.

Much change in the level of beef and veal production in South America is unlikely during 1981. Production in Brazil may be up as the cattle herd continues to grow, but it is likely to be lower in Argentina.

¹ World inventories and production as used in this paper include estimates for the major producing countries. Estimates are not available for some countries.

Higher levels of output in some of the smaller producing countries could result in a small increase in South American beef and veal production.

Cattle inventories in Australia and New Zealand at the beginning of 1981 may be near to a little larger than a year earlier. While Australia has had a severe drought this year which slowed the turnaround in its cattle herd, New Zealand has had excellent pasture conditions. The buildup in cattle numbers in New Zealand is expected to be very small, and production in 1981 may not quite match the 1980 level that was favored by good conditions and heavy slaughter weights. Beef and veal production in Australia next year probably will be little changed from the 1980 level.

In the European Community—EC—beef and veal production rose slightly this year but it is likely to be about the same to down slightly in 1981. France, West Germany, and Italy—the largest beef and veal producers in the EC—may have a little higher level of production in 1981.

It appears there has been a concentrated effort in the Soviet Union to maintain cattle inventories despite feed shortages. Beef production has suffered and the 1980 level of output will be down from a year earlier. While the cattle inventory may still be larger than a year earlier at the beginning of 1981, current prospects for feed supplies suggest that 1981 beef and veal production may once again decline.

Pork production likely to decline

High feed cost and poor producer returns are resulting in cutbacks in pork production in many countries. This is likely to result in a slight decline in world pork production in 1981, the first year-to-year decline since 1976.

Pork output in North America will be down as a result of lower production in the United States, Canada, and Mexico. This follows very high levels of production in 1980 that led to lower hog prices and financial losses to producers.

In South America, pork production will probably be up again in 1981 as Brazil, the major producing country, continues its strong expansion.

EC pork production is expanding again in 1980 with increases occurring in all member countries except the United Kingdom and Ireland. Another increase in total EC pork production is expected in 1981.

Soviet pork production will be down this year. Inventories of hogs and pigs at the beginning of 1981 will be down from a year earlier reflecting shortages of feeds this year. Current prospects for feed supplies suggest that the Soviets will have trouble with feed availability again in 1981. If the feed shortage is as severe as now seems likely, it is likely that pork production in 1981 could slip further from this year's depressed level.

Japanese pork production will increase about 5 percent this year following an 11 percent increase in 1979. Pork stocks have been up and prices down and steps have been taken to reduce stocks and the breeding inventory. For 1981, it now looks as if pork production in Japan will remain near to slightly above the year-earlier level.

Poultry production continues to rise

Despite sharply higher feed costs in 1981, it appears as if world poultry production will once again expand next year. The 1981 expansion, however, is not likely to be as large as the 1980 growth. Higher levels of output are expected in North America with the United States, Canada, and Mexico all showing increases. Production increases are also expected in South America. In Japan, poultry production likely will continue to expand in 1981.

Most countries in the EC are expected to have higher levels of poultry production in 1981, pushing the EC total above the 1980 level. Most other European countries are also likely to expand poultry production in 1981.

Poultry production in the U.S.S.R. during 1980 has been greater than last year despite shortages of feed and reduced production of other meats. Given the Soviet emphasis on poultry production, it may increase again in 1981. However, if Soviet feed supplies are as limited as seems likely now, poultry production may decline next year.

WORLD CONSUMPTION AND TRADE TRENDS

Per capita meat consumption—red meats and poultry meat—in most countries continues to increase, but few countries have a level of total meat consumption per person that approaches that of the United States. Only in Argentina and Australia is per capita meat consumption as much as 90 percent of the level of consumption in the United States. In New Zealand, meat consumption per person is just over 85 percent of the U.S. level, in Canada it is about 80 percent, in the EC about 70 percent, less than 33 percent in Japan, and only about 25 percent in Mexico.

In the past two decades, per capita meat consumption in the United States rose over 40 percent. Australia and Argentina had higher levels of meat consumption in the early 1960's than did the United States. But the growth in consumption in these countries since then has been much less than in the United States, rising less than 15 percent since 1961. Growth in many other countries has been even greater than in the United States with countries like Japan showing about a sixfold increase in the last two decades, the EC up about 60 percent, Mexico almost doubling, and several others showing more than a 200-percent rise.

From the low levels of consumption relative to that of the United States, there is expected to be continued sharp increases in meat consumption in many countries. With rising populations and further increases in per capita consumption, there will be continued pressure on the world's capacity to produce meat to supply this demand.

This rising demand has implications for trade patterns. This year, some sizable changes in the level of meat trade between selected countries have been noted. The Soviet Union has been a major purchaser of meat this year in an effort to offset some of its decline in internal production. The sharp rise in imports by the Soviets has provided a much different trade pattern this year and much uncertainty remains about future level Soviet imports.

Beef trade has been down substantially this year reflecting tight world supplies. Beef imports by the United States, by far the world's largest importer of beef, will be off around 12 percent this year. Beef imports by all importing countries combined are also likely to be off about 12 percent. While world beef production may be up a little in 1981, there is not likely to be much rise in beef trade. Beef and veal imports next year by the United States are expected to remain near the 1980 level.

FEED SUPPLIES AND PRODUCTION COSTS

Feed supplies and prices have had a significant impact on meat production in recent years and will continue to do so next year. Large supplies of feed grains and soybeans at prices favorable to livestock and poultry producers contributed to the record-high levels of meat production this year. But this summer's drought in the United States and developments around the world are now dramatically changing this situation.

In 1979-80, U.S. feed grain production was 233.9 million metric tons, almost 8 percent larger than a year earlier. Based on conditions through October 1 of this year, the 1980-81 feed grain crop is estimated to total only 192.4 million metric tons, almost 18 percent below the crop of a year earlier. However, with large carryover stocks, the total feed grain supply is down only 13 percent.

Export demand for feed grains has been strong and is expected to continue. Domestic feed use will be down this year but it will still be relatively high. Thus, the strong export demand combined with a continued high level of domestic use is drawing down stocks and pushing feed grain prices higher. At the farm level, corn is expected to average \$3.30 to \$3.75 per bushel during 1980-81, compared with \$2.50 the previous year.

The 1979-80 soybean crop of 2,268 million bushels was record large and 21 percent larger than a year earlier. But this summer's drought reduced this year's soybean crop and as of October 1 the 1980-81 crop was estimated at only 1,757 million bushels, 23 percent less than last year's crop. But with record large stocks at the beginning of the year, the total supply will not be down quite as much as that implied by the production decline. The export market for soybeans and soybean products also remains strong. Exports rose in 1979-80, but could slip this year depending on soybean production in some of the other major exporting countries.

The smaller crop and continued strong demand, both domestically and for exports, is resulting in sharply higher prices. Soybean meal—44-percent protein, Decatur—is expected to average around \$250 per short ton during the 1980-81 crop year. This compares with only \$180 per ton a year earlier and \$190 per ton in 1978-79.

The sharply rising prices for feed grains and protein meals are pushing livestock and poultry feeding costs much higher. Prices for other production inputs also continue to rise and they are expected to average higher in 1981 than they have this year. This means that the cost of producing meat in 1981 will be substantially higher than this year.

U.S. MEAT PRODUCTION AND CONSUMPTION

Large changes in meat supplies during the last 2 years have had a major impact on livestock and poultry markets. Recently, there have been some major shifts in types of meats available to consumers and the total supply has reached record-high levels. Production levels and the impact on patterns and levels of consumption are examined below.

Meat production declining from record-high levels

Total U.S. meat production was between 51½ and 52 billion pounds from 1976 through 1979. This year, total meat output may exceed 53 billion pounds, up 2 to 3 percent from a year earlier. At this level, 1980 output would be up about 29 percent from the 1965 level and a little over 11 percent greater than in both 1970 and 1975. Total meat output in 1981 is expected to decline but it may still exceed 52 billion pounds.

This year's record-high level of meat output will be the result of sharp increases in pork production and a little larger poultry production combined with beef output near last year's level. Pork production in 1979 was up over 15 percent from the year earlier and a 7-percent rise is expected for this year. Pork production in 1980, however, saw sharp rises during the first half of the year and year-to-year drops during the last 6 months. The expected 1980 pork output would be record large and over 40 percent greater than the low level of production in 1975. Current indications are that a sharp decline in pork production is likely next year.

Total poultry production rose almost 11 percent last year as both broiler and turkey output rose. This year's output probably will be up about 2 percent as a result of sharp increases during the first half of the year. But, because of a severe cost-price squeeze on producers from mid-1979 through mid-1980, production is being cut. Second-half 1980 poultry output will be lower than a year earlier.

Poultry production is expected to increase again in 1981 but the higher feed costs will limit these gains. Year-to-year increases in poultry meat output are likely to be larger during the last half of 1981 than during the first half.

Following 1979's large decline of over 11 percent in beef production, the 1980 output may be about unchanged from the year earlier. First-quarter 1980 beef production was down 5 percent from a year earlier, but production has been greater since. For 1981, beef production is expected to about equal the 1980 level. With production in each of the years 1979, 1980, and 1981 being at about the same level, they would all be about 17 percent less than the record-high production in 1976.

These production situations for the various types of meats have resulted in very large total meat supplies this year. First-quarter total meat production was 6 percent greater than a year earlier and second-quarter production was up 7 percent. These large increases in production were significant in the weakness in livestock and poultry prices this spring.

Total meat output gains slowed this summer. Third-quarter total meat production declined seasonally and was near the year-earlier level. This was different from the situation of last year when third-

quarter production rose seasonally and from a year earlier. This fall, total meat production will increase seasonally but will be lower than a year earlier.

Total meat output for 1981 is expected to be down from this year's level. First-quarter production may be near the year-earlier level as increases in beef production almost offset lower pork production and poultry production rises slightly. Total meat output next spring, however, is expected to drop substantially below the record-high 1980 level as a result of lower red meat production. During the last half of 1981, red meat production is likely to remain under the July-December 1980 level but poultry production may be larger. This is expected to result in a slightly lower level of total meat output than that of this year. For all of 1981, total meat production may be down 1 to 3 percent from the record high output of this year.

Meat consumption also record high but slipping

In first quarter 1979, per capita meat consumption—retail weight basis—was down a little from a year earlier. It was during this period when a sharp upward spiral in meat prices got underway. Then during the spring quarter, as pork production increased sharply, per capita meat consumption rose a little above the year-earlier level. Year-to-year increases in per capita consumption continued during the last half of 1979, and meat prices weakened.

At the beginning of this year the situation was considerably different from the previous year. Per capita meat consumption rose above the year-earlier level and was a record high. This continued through the spring and meat prices dropped below the year-earlier level. But this summer per capita meat consumption slipped to about the same level as a year earlier. With pork supplies dropping from the year-earlier level this fall, per capita meat consumption will be lower than during October-December 1979. For all of 1980, per capita meat consumption will be record large and may exceed 212 pounds.

In 1981, per capita meat consumption will decline and for each quarter it probably will be below the level of the previous year. The largest declines are likely to occur during the spring which could be a period when strong upward pressure on meat prices develops. By the end of 1981, per capita meat consumption may be only slightly under the level of this fall. Per capita meat consumption for all of 1981 will be down from the record-high 1980 level but may still be near the 1976-78 level.

Poultry accounts for higher percentage of meat consumed

During the past decade there have been some large year-to-year shifts in the types of meats consumed in the United States. Cyclical changes in production have been the primary cause of these changes in consumption but net trade in meats has made a minor contribution. However, there has been a general trend of poultry accounting for a larger share of the total meat consumed.

As beef consumption rose in the 1970's, it accounted for a larger proportion of all meats, increasing from about 41 percent in 1970 and 1971 to 46 percent in 1976. It has since declined and in 1980 may account for around 37 percent. Per capita beef consumption may decline slightly in 1981 but, with the sharp drop in pork consumption, beef may account for almost 38 percent of the total.

Pork consumption as a percent of total meats has fluctuated more than either beef or poultry. It dropped from over one-third in 1971 to just over one-fourth in 1975 and 1976 and, with the large available supplies of this year, it could once again account for almost one-third of the total meat consumed. In 1981 as pork production drops sharply, pork may account for around 30 percent of the meat consumed.

Red meats accounted for over three-fourths of total meat consumption in the early 1970's. In the mid-1970's, red meats' share of total consumption began to slip and then became more pronounced in 1978 and 1979 when beef supplies dropped sharply. This year, red meats may account for almost 71 percent of the total but this will probably drop to under 70 percent in 1981.

With poultry production rising during the decade of the 1970's, it accounted for a larger share of total meat consumption. Both broilers and turkeys have gained a larger share of the total and poultry may account for about 29 percent of the meat consumed this year and over 30 percent in 1981. This compares with less than 24 percent in 1970 and 1971.

DEMAND PROSPECTS

The effect that various factors have on the consumer demand for meats is difficult to measure, particularly when viewed in the short run. The primary determinants of the long-run demand are consumers' tastes, preferences, attitudes, and incomes. Current incomes and relative prices of other products affect short-run demand. When the prices for many goods are changing rapidly as has occurred during the past year, it is difficult to measure the consumer response and the effect it has on the demand for any one product.

One approach to examining the demand for meat is to look at incomes, savings, and expenditures for various goods. This approach does not give conclusive evidence about either the level or changes in the demand for meats but at least it gives some indication of whether it is strengthening or weakening.

Growth in consumer incomes to strengthen

Per capita disposable income—current dollars—rose rapidly during the last decade, far outpacing the rate of increase in the previous two decades. Real incomes, however, rose at a much lower rate than current dollar incomes and the rate of growth during the 1970's was near that of the 1960's. Rising incomes and a strong preference for meat generated a strong demand for meats as evidenced by a general upward trend in per capita meat consumption at higher prices.

Per capita disposable income increased 10.9 percent—current—and 3.8 percent—real—during 1978. Incomes continued to rise substantially in early 1979, but then the growth began to slow with real income actually dropping below the year-earlier level by late in the year. For all of 1979, per capita disposable income rose 10.5 percent—current—and only 1.5 percent—real. As the growth in income tapered off in 1979, the demand for meat weakened. Incomes weakened further this spring when current dollar incomes were rising at an annual rate of only 3.4 percent. Meanwhile per capita disposable income in real terms declined at a 6.8-percent annual rate. This contributed to a weak demand situation for meat this spring.

The impact of the decline in economic activity on the demand for meat was lessened this summer by record-large cost-of-living increases in Federal transfer payments. Per capita disposable income during the third quarter rose at an estimated annual rate of 11.2 percent—current—and 1.5 percent—real. Fourth-quarter income growth is expected to slow from the summer quarter level but it is expected to be much stronger than in early 1980. For all of 1980, per capita disposable income is expected to be up around 9 percent—current—but down over 1 percent—real.

In early 1981, the outlook for consumer incomes does not suggest much strength in the demand for meats, compared with late 1980. There will, however, be some seasonal demand shifts occurring during this period. Per capita disposable income in current dollars is expected to rise at an annual rate of under 10 percent during the first half of the year but then pick up and rise at a rate of over 10 percent in the last half of the year. Real per capita disposable income, however, likely will be down during the first half of the year but show its strongest growth since 1978 in the last half of the year. This would suggest that the demand for meat will strengthen toward mid-1981.

Next summer, the demand for meat may again be strengthened by increased Federal transfer payments. This expected 1981 income situation suggests stronger demand for meat next year than existed during much of 1980. The real strength, however, will depend on how consumers allocate their incomes to various goods, services, and savings.

Shifts occurring in personal consumption expenditures

Personal consumption expenditures—PCE—for all goods and services have grown steadily during the past 2½ years, rising 11.6 percent in 1978 and 11.8 percent in 1979. They continued higher this year, rising about 12 percent during the first quarter and 10 percent during the second. While up from the year earlier, second-quarter total expenditures were down slightly from the level of the first quarter but began rebounding this summer.

Within the total expenditures some shifts occurred that probably affected the demand for meat. PCE for durable goods rose 12 percent in 1978, but only 6.3 percent last year. As the economic situation deteriorated during 1979, year-to-year increases in PCE for durable goods fell from over 15 percent during the first quarter to less than 2 percent in the fourth quarter. PCE for durables were up about 3 percent during the first quarter of this year but this spring they dropped 6 percent below the year-earlier level. PCE for durables also picked up this summer.

It often has been hypothesized that during a recession when consumers shift away from durables they spend more for meats. This does not seem to have been the case in 1980. For instance, this spring when total personal consumption expenditures rose about 10 percent above the year-earlier level and expenditures for durables declined 6 percent, meat expenditures declined about 4 percent. During the last half of 1980, however, meat expenditures are rising a little above year-earlier levels. How consumers allocate their incomes during the next year will have a major impact on the demand for meat. If there is a strong recovery in expenditures for durables this could hold down the demand for meat. On the other hand, if incomes continue to rise and

durable expenditures remain low, then this could help strengthen the demand for meat.

PCE for nondurable goods rose faster than those for durables in 1979 and continued to rise this year when durable expenditures fell. During 1978, PCE for nondurable goods rose 10.2 percent but in 1979 they rose 12.5 percent. They rose over 14 percent during the first quarter of this year and continued almost 13 percent above the year-earlier level this spring when durable expenditures fell almost 6 percent.

Changes in PCE for various categories of nondurable goods have been vastly different. During 1978, combined PCE for two energy related categories of goods—gasoline and oil plus fuel oil and coal—increased 8.5 percent while PCE for foods rose a little over 10 percent. The situation was much different last year when sharply rising petroleum prices pushed PCE for the energy related goods up sharply. PCE for the energy related goods rose almost 29 percent last year compared with an increase of 11.2 percent for food. Increases for the energy related goods rose faster during the latter half of the year than in the first 6 months, up almost 37 percent in the third and fourth quarters compared with about 18 percent during the first quarter. They continued to rise sharply this year, up 43 percent in the first quarter and 37 percent in the second quarter.

This sharp takeoff in PCE for the energy related goods coincides closely with the declining meat prices which began last spring. Price increases for petroleum products have slowed and consumers have adjusted to the higher prices by reducing their purchases of some of these products. This should slow the increases in PCE for energy related goods. With consumers having made some of these adjustments, it is not expected to have as much weakening effect on the demand for meat in the coming months as it has had in the past year. Year-to-year increases in PCE for the energy related goods likely will be much smaller next year than they were this year. Thus, with incomes continuing to rise, this will relieve consumers of some of the pressure they have felt in the past year as they had to allocate an increasing share of their income to these goods.

PCE for services have also been increasing. These increases, however, have been more stable than those for either durable or nondurable goods. Also, they have increased at a slightly higher rate than PCE for all goods and services.

Personal savings low

To help maintain the high level of PCE in late 1979 and early 1980, consumers drew down personal savings. Personal savings increased over 10 percent in 1978, but only 2.5 percent last year. During the latter part of 1979, savings were dropping below the year-earlier level with the fourth quarter showing over a 16-percent decline. Personal savings during the first quarter of this year rose some from the fourth-quarter 1979 level, but were still almost 19 percent lower than a year earlier. Savings picked up this spring as consumer attitudes about the economic situation began changing and were near the level of a year earlier. Savings began to slip a little this summer from the level they had attained earlier in the year. The level of personal savings could affect the demand for meat but it will probably have more impact on the purchases of durables than on meats.

RETAIL MEAT PRICES

During 1980, only moderate increases in retail meat prices will be registered. The record-large meat supplies and a weaker demand situation than existed in 1979 will be responsible for these moderate increases. The Bureau of Labor Statistics—BLS—index of retail beef prices may rise around 6 percent this year following the 27-percent increase registered last year. In 1981, the BLS index of retail beef prices will likely average 12 to 16 percent above the 1980 level.

Sharpest increases in meat prices next year are likely to be for pork. The BLS retail pork price index rose only 2 percent in 1979 and for 1980 it will probably be down around 2 percent. But in 1981 with sharply reduced pork supplies and an expected strong demand situation, retail pork prices may average 25 to 30 percent above the 1980 level.

These rises in beef and pork prices would push the retail red meat price index sharply higher in 1981, perhaps similar to the 17-percent increase registered in 1979. The BLS total meat price index will be up only around 4 percent this year.

Poultry prices will also be up sharply next year. In 1979, when the BLS retail red meat price index rose 17 percent, the poultry meat price index rose only 5 percent. This year the poultry price index will probably be up a little more than that for red meats, perhaps averaging around 6 percent above the 1979 level. For all of 1981, a 14- to 18-percent increase in retail poultry prices is expected.

BEEF CATTLE OUTLOOK

(By Ronald A. Gustafson, National Economics Division, Economics and Statistics Service, U.S. Department of Agriculture)

This past year has been a disappointing period for most cattle producers. Despite the smallest cow herd since 1968 and the fourth consecutive year of decline in per capita beef supplies—conditions which should indicate profitability—1980 has been a year of losses for most producers. Large supplies of competing meats were expected. However, the rapid increases in production costs, the sharp economic dip in the second quarter, and a widespread drought were not fully expected. These same issues continue to cloud the outlook. A year of record high cattle prices beginning in the second quarter is very likely, yet 1981 may not be a favorable year for profits as it appears to be at casual glance. Only modest improvements are expected in the economy next year, yet prices of most inputs, most notably feed costs are expected to increase further in 1981. For cattle feeders a tightening feeder cattle supply will further increase the cost of their primary inputs as the spring grazing season begins. Thus, higher cattle prices in 1981 will likely be offset to a large extent, by further increases in production costs.

PRODUCTION COSTS CONTINUE TO RISE

Feeder cattle producers and cattle feeders both face sharply higher production costs until at least mid-1981. Reduced grass accumulation due to drought this summer will force many feeder cattle producers to begin supplemental feeding earlier this year and the quantities fed per animal will be larger. Also, this summer's hay crop was 13 percent smaller than last year's and despite record high carryover stocks from the mild winter last year, the hay carryover next spring will likely be the lowest since 1965. Hay prices averaged nearly \$75 per ton in October compared to \$63 a year ago. An unusually long hard winter would force prices even higher. Most other input prices are expected to continue on their upward spiral although perhaps at a moderating rate. All petroleum-related products are expected to continue their recent upward trend. Consequently areas such as the Southeast which are dependent on fertilizer to maintain good pasture growth will continue under cost pressure.

Cattle feeding costs have also increased sharply this fall as grain prices approach new record levels. Increasing fed cattle prices in the first half of 1981 will tend to offset increasing feeding costs. Only moderate profit margins are likely for cattle feeders this fall and winter. However, rapid increases in fed cattle prices next spring should provide feeders with much needed increases in their profit margins. However, prices of feeder cattle, the largest feeding expense, are expected to

increase sharply during the spring as the grazing season begins. Fed cattle prices are not expected to increase much above the spring highs in the second half of 1981. Consequently, feeders may find themselves with narrow to possibly negative feeding margins again in the late summer and fall. Of course feeding margins would be higher if expected feeder cattle price increases are held down or if feeding costs decline next summer as the 1981 grain crop comes into focus.

CATTLE INVENTORIES

The cattle and calves inventory on July 1 indicated a rapid early rebuilding of cattle numbers. Cattle numbers increased 4 percent from 1979 levels. Total cow numbers increased 5 percent, including 6 percent more beef cows. The 1980 calf crop was estimated at 45.5 million head, up 6 percent from last year's 42.8 million. The sharp increase in cow numbers and the larger 1980 calf crop was due to a record high 56 percent of the 10.1 million heifers being saved for herd replacement on January 1 calving and entering the cow herd.

These figures reflect the strong rebuilding effort following the 21 million head herd reduction which occurred between 1975 and 1979. Record high cattle prices prevailed during the 1979 breeding season (March-June) in the spring calving regions. These strong prices, very favorable grazing conditions in most areas, and reduced herd culling due to a very mild winter were all conducive to the herd expansion during the first half of 1980.

Higher cattle prices since 1978 have helped to rebuild the feeder cattle producer's financial base. Established farms and ranches on which the cattle enterprise is either the only or a primary source of income have had underutilized forage resources, due to the reduced cattle inventories and generally favorable grazing conditions until this past summer. These farms and ranches form the base for the present expansion. They will continue to expand, as grazing conditions improve, to more fully utilize their forage acreage and to increase their farm income. Much of this expansion is occurring in the Plains and Western States.

Shifts of land from pasture to crop production and higher energy costs have undoubtedly had greater impact on cattle producers in the Eastern States. Beef cow expansion in the North Central and South-eastern regions was lower than the 6 percent national rate. Although total U.S. beef cow numbers last July 1 were 16 percent below the record 1975 levels, the beef cow herd in these two regions was still over 20 percent below 1975 levels.

Expansion in these two regions has been reduced because of land shifted out of beef production and higher energy cost. Since 1972, 63 million additional acres have been planted to the principle crops; 13 million acres were added in 1980 with further expansion expected in the future. Preliminary census data indicate that total cropland expanded by nearly 22 million acres between December 31, 1974 and 1978. During this same period, cropland used only for pasture declined by 6.4 million acres. In addition, other pastureland, rangeland, land in houselots, ponds, roads, wasteland, et cetera declined by 9 million

acres. Since the acreage in houselots and roads have increased, the reduction in pastureland and rangeland has undoubtedly declined by more than 9 million acres. This cropland pasture acreage shifted back to crop production was some of the most productive pastureland. This shift of acreage back to crop production may leave other acreage on individual farms unused because it is not suitable for crop production, and it is not large enough to form an economic beef unit. The 1978 State Census data will provide a clearer picture of these acreage shifts. However, these shifts have undoubtedly reduced the total base for future beef herd expansion.

In addition to shifts of land back into crop production higher production costs due to increased fertilizer prices has further slowed herd expansion in the Southeast. Pasture fertilization is necessary in most Southeastern producing areas to maintain favorable grass stands and grazing quality.

Low cattle prices last spring during the breeding season and severe drought this summer through the Great Plains and Southeastern States will undoubtedly slow the rate of expansion in 1981. Fewer heifers are expected to calve and enter the cow herd next spring due to the poor price incentive for expansion this spring. Feeder steer calves at Kansas City averaged only \$82 this spring compared to \$103 a year earlier. In addition, cow slaughter in the second half of 1980 has increased above year-earlier levels due to the summer drought and reduced fall and winter forage supplies.

Expansion is expected to continue over the next few years to more fully utilize forage resources on farms and ranches where the cattle enterprise represents an important source of income. However, many producers who sold off their beef herds in the 1970's are not likely to return to beef production particularly on farms where much land has shifted back to crop production and the cattle enterprise represents only a small source of farm income. Higher prices expected for herd replacements over the next few years and continued strong grain prices will further deter reentry.

The rate of beef herd expansion indicated this year has been alarming to some, given the severe liquidation that the industry has just gone through. However, the 115 million head expected on January 1, 1981, is well below the 132 million head record. In addition, future increases will likely be moderated because the land resource base is smaller, and the price of many of the inputs needed to raise pasture and range carrying capacity, most notably energy costs, are much higher. Additional land is likely to be shifted to grain production as world demand expands and energy related cost increases continue. Consequently, unless the current outlook for the beef cattle land resource base or energy costs change drastically, the problems of the last cycle are not likely to be repeated very soon. This new cattle cycle is expected to take longer to peak because of the sharp 1975-79 herd liquidation and smaller resource base. Traditional cattle producing areas will continue to expand to full capacity over the next few years, but cattle numbers at the end of this cycle are still not likely to exceed the previous peak in numbers. Cattle numbers may only pause after the expansion peaks, similar to that of 1967, before continuing a slow gradual herd buildup.

FEEDER CATTLE MIX CHANGING

A calf crop of 45.5 million head expected this year is 6 percent above last years calf crop. The 1981 calf crop is expected to increase by only 2 to 4 percent—still a sizeable increase. However, the feeder cattle supply mix is likely to change substantially in 1981. Nonfed steer and heifer slaughter has been large since the second quarter. Poor feedlot demand due to continued negative feeding margins resulted in nearly an 800,000 head nonfed steer and heifer slaughter this spring. Drought this summer forced an earlier than usual movement of cattle off grass and the movement continues this fall due to reduced forage supplies. Nonfed steer and heifer slaughter totaled slightly over 800,000 head in the third quarter, and may stay in this range during the fourth quarter. Improved prospects for winter wheat grazing in the High Plains and winter rye grass pasture in the Southeast could provide additional forage supplies enabling producers to carry more cattle over the winter for placement on feed next spring.

On October 1 the feeder cattle supply outside feedlots was 4 percent above a year ago. The calf supply was 7 percent larger but the yearling supply declined by 7 percent, to the smallest number of yearlings on October 1 since 1973. Continued large nonfed steer and heifer slaughter this fall and winter will further reduce the yearling feeder cattle supply.

In 1981, many feedlots will be forced to switch from a yearling to a calf feeding program as yearling supplies decline. Consequently, increased feedlot placements in 1981 will depend on lighter weight cattle being placed on feed. More cattle could be placed on feed at lighter weights in response to expected higher fed cattle prices, particularly in the second quarter. However, sharply higher feeding expenses, and reduced yearling feeder cattle supplies and consequently even higher prices for lighter weight feeder cattle, may slow the shift to increased placement at lighter weights.

Feeder cattle prices are expected to repeat the patterns of 1979, particularly as the 1981 grazing season nears. Reduced yearling feeder cattle supplies, increased heifer retention for herd expansion and strong feeder cattle demand will boost feeder cattle prices to record levels next spring. Feeder cattle prices may average \$80 this winter, with much of the price increase coming late in the quarter. Prices may approach the upper \$80's during the second quarter. Increased supplies of feeder cattle from the spring calf crop will about offset stronger demand for feeder cattle next summer and fall, particularly if the fall grain harvest looks favorable. Yearling feeder cattle prices will likely remain in the mid-to-upper \$80's in the second half of 1981. Lighter weight feeder cattle prices next year may increase at a greater rate than prices for yearling and could again exceed \$100 per hundred-weight, well above the low \$80's of 1980.

INCREASED FED BEEF SUPPLIES TO BOLSTER 1981 BEEF PRODUCTION SLIGHTLY

Beef production in 1980 will slightly exceed 1979 output. Increased nonfed slaughter in the last three quarters of 1980 has more than offset reduced fed cattle marketings in the first three quarters. Higher nonfed slaughter in 1980 will temper production increases in 1981.

Slight production increases in 1981 will be due almost entirely to increased fed cattle marketings and consequently heavier slaughter weights. Feeders reduced placement rates in reaction to negative feeding margins which persisted from the second half of 1979, through the third quarter of 1980. This resulted in fed cattle marketings in 1980 dropping over a million head below last year and 3 million head below 1978 levels. Feeder cattle prices dropped sharply this spring in reaction to record high interest rates and a slowing economy. Cattle placed on feed during this period began to be marketed late in the third quarter, producing the first profits since the second quarter of 1979.

Cattle feeders began to increase feedlot placements this summer in reaction to the drought forcing larger numbers of feeder cattle on the market at favorable prices and prospects for improved feeding margins. Net feedlot placements in the 23 major cattle feeding States during the third quarter were 9 percent above year-earlier levels. This was the first year-to-year increase since the third quarter of 1978. However, the number of cattle on feed on October 1 was only slightly above fourth quarter levels of last year and were 12 percent below 1978 levels.

Continued large feeder cattle marketings in the fall and winter quarters plus prospects for higher fed cattle prices will encourage increased feedlot placements above levels of a year ago. Placements and marketings likely will remain above 1980 levels throughout 1981. However, increased fed cattle marketings will be up enough to only slightly exceed the decline in nonfed slaughter. Production late next summer through the fall quarter of 1981 remains the most uncertain. Feeder cattle prices will increase sharply as the grazing season approaches next spring. Any further increases in feeding costs could increase cattle feeders' uncertainty and willingness or ability to place more cattle on feed because break-even prices for marketings in late summer and fall would be much higher. Conversely, prospects for a large grain crop and lower feed prices, could encourage increased feedlot placements at lighter weights.

Nonfed steer and heifer slaughter will decline from the larger 1980 levels in the second quarter and remain below for the remainder of 1981—assuming that more nearly normal grazing conditions prevail next year. Cow slaughter will exceed 1980 levels; due exclusively to the larger cow herd. The only beef cows likely to be slaughtered next year are those with extremely low productivity potential.

SHARP PRICE INCREASES IN SPRING

Continued large nonfed slaughter and increased fed cattle marketings will hold gains in fed cattle prices down during the rest of this year and the first quarter of next year, despite reduced pork production. Price increases because of continued declines in pork production throughout 1981 will be accentuated by reduced nonfed slaughter beginning late in the first quarter. Cattle prices will be further strengthened in the second quarter as fed cattle marketings decline from the large first quarter levels. Meat supplies in the second quarter will be well under year-earlier levels.

Choice grade fed steers at Omaha may average in the lower \$70's in the first quarter but are expected to be near \$80 in the spring and remain in this price range throughout the second half of the year.

Feeder cattle prices will increase sharply in the second quarter as the grazing season begins, perhaps by \$15 above prices this spring. Reduced supplies of nonfed beef and pork will increase the demand for processed meats giving a boost to cow prices. Brood cow prices will increase even more sharply due to higher feeder cattle prices. Utility cows could average over \$10 higher than this spring's prices. Farm prices for cattle should be at record levels next spring before declining slightly in the fourth quarter.

RETAIL PRICES TO INCREASE

Per capita beef consumption in 1981 is expected to decline for the fifth consecutive year as population increases more than offset a slight expansion in beef production. Large nonfed beef supplies helped hold beef consumption up in 1980 but at the expense of 1981 consumption. Per capita consumption may decline slightly from about 78.4 pounds consumed in 1980. Combined with sharp declines in pork production and slight increases in poultry output, beef prices are expected to increase 12 to 16 percent in 1981. Consumption will be slightly above year-earlier levels in the first quarter, but will fall well below in the second and third quarters. Consumption may increase and approximate year-earlier levels in the fourth quarter. Beef production should continue increasing in 1982 due to continued herd expansion and larger calf crops.

Retail prices in 1980 have been held down by narrower than expected farm to retail price margins. In 1981 it is expected that retailers will be more likely to expand the spread to recoup higher costs. The only real opportunity for holding down retail price gains or supporting higher cattle prices, may be a return to more favorable prices for hide and byproduct credits. These prices have held well below 1979 levels this year as major hide importers worked down large supplies accumulated in 1979 when an embargo on U.S. cattle hide exports was being discussed.

Retail beef prices may average about \$2.70 to \$2.75 per pound in 1981, up from the \$2.40 expected for this year.

MUCH UNCERTAINTY FOR CONSUMERS AND PRODUCERS—1981

In spite of much higher fed cattle prices in 1981, feeding margins will not expand as rapidly as might be expected due to sharply higher feeding costs. Any reductions in consumers ability or willingness to pay these higher prices, or even higher feeding costs, in the second quarter of 1981 could reduce feedlot placements due to concerns over negative feeding margins particularly late in the third and throughout the fourth quarter of 1981. On the other hand, prospects for a large 1981 grain harvest or reduced feeding costs, could encourage feeders to place more cattle on feed at lighter weights thus expanding beef production beginning late in the third quarter resulting in moderating retail prices.

HOG OUTLOOK

(By Robert D. Remmle, National Economics Division, Economics and Statistics Service, U.S. Department of Agriculture)

Hog producers suffered large losses or fared reasonably well in 1980 depending on the time of production and the purchase of feeds. Producers suffered large losses in the first half of the year as hog prices declined to less than \$30 in April and May. Those that became discouraged and sold feeder pigs rather than finishing them or culled breeding stock heavily during the months of lowest prices were hit hardest. Producers fared better in the second half of the year, especially if feed requirements had been purchased before corn prices increased this summer.

Hog prices are expected to increase in 1981 because producers adjusted their breeding inventories downward in response to losses in 1980. These losses likely caused many small to medium sized producers to cease production. However, the larger volume operators are more committed to continuing production. They may make only small downward adjustments in their output unless their financial losses in 1980 were so severe that they were forced to cease operation. Much of the higher returns in 1981 are expected to be offset by higher production costs, especially higher feed costs.

PRODUCTION COSTS INCREASE SHARPLY

Feed costs rose sharply during the second half of 1980 as it became apparent that yields of the major feed grains would be reduced by this summer's dry, hot weather. Grain prices will be substantially higher in the months ahead than they were a year earlier, but not much higher than current prices. Commercial protein supplements will also cost more, but the increase may not be as sharp as for grain. Total feed costs for the average farrow-to-finish operator may increase to \$37 per hundredweight of hogs sold in 1981, up from \$30 in 1980.

Other cash costs—medicine, fuel, repairs, labor, etc.—averaged about \$14 in 1980 and may increase to \$15 in 1981. Fuel and energy prices increased nearly 39 percent in 1980, more than other production items. Prices of other production items increased about 10 percent in 1980, and a similar increase is expected in 1981.

Consequently, total cash costs may average near \$52 per hundredweight in 1981, up from \$48 in 1980. Total production costs, which include cash costs as well as noncash costs such as operator labor and management and depreciation, are even higher. The total costs for new entrants to hog production with modern facilities may exceed \$60 in 1981.

Producers reacted to the severe financial losses in the first half of 1980 by slaughtering more sows and boars than they did in 1979 and

adding fewer gilts to the breeding inventory. Commercial sow slaughter in the first half of 1980 exceeded year-earlier levels by 30 percent and boar slaughter was up 35 percent. Consequently, the breeding inventory declined from year-earlier levels. By June 1, 1980, the U.S. breeding inventory was estimated to be 8 percent smaller than a year ago. Producers continued to liquidate through the summer so the breeding inventory on September 1, 1980, in the 14 major hog producing States was 5 percent smaller than on June 1 and 10 percent smaller than a year earlier.

Breeding inventories this September 1 were down 10 percent or more in the Southeast, the eastern Corn Belt, Kansas, and Nebraska. Corn prices have been higher in the Southeast and the eastern Corn Belt, so producers in these areas that grow their own corn may have considered selling corn directly rather than feeding it to hogs. Kansas and Nebraska were hit extremely hard by the heat and drought which reduced local feed supplies.

Producers in Minnesota, South Dakota, Wisconsin, and Iowa reduced their breeding inventories 6 percent or less. Producers in these areas have experienced corn prices below the national average, so their feed costs have not been as high. However, there are still many hog producers in these States where the hog operation is supplementary to cash grain production. These producers have more flexibility in adjusting hog production to hog and feed prices. If corn prices rise above the \$3-per-bushel average of October, more of these producers may opt for cash grain sales rather than hog production and reduce breeding inventories further.

Paralleling the decline in breeding inventories was a decline in the number of sows farrowing. Farrowings in the 14 States were up 3 percent from year-earlier levels during December 1979–February 1980, but fell 3 percent below a year earlier during March–May. This was the first time since the March–May quarter of 1978 that farrowings fell below year-earlier levels. Farrowings were down 10 percent during June–August. Producers also indicated September–November farrowings may decline 10 percent and December–February farrowings 7 percent.

As a result of the decline in farrowings, the September 1, 1980, inventory of hogs and pigs was 3 percent smaller than last year. The breeding inventory declined 10 percent and the market inventory dropped 2 percent.

HOG SLAUGHTER EXPECTED TO DECLINE IN 1981

Hog slaughter through the first half of 1981 is largely determined by this time and current indications are that it will be below year-earlier levels. Slaughter through the first quarter of 1981 will be drawn primarily from the September 1, 1980, market inventory and second quarter slaughter will come from the September–November pig crop.

Hog slaughter under Federal Inspection in the first 6 weeks of the fourth quarter was down 4 percent from the same period a year ago. Slaughter is expected to remain below year-earlier levels for the rest of the quarter, so commercial slaughter for the fourth quarter may total near 24.3 million head. Since slaughter was up sharply early in the year, the annual 1980 commercial hog slaughter will total about 95.8 million head, 7 percent larger than 1 year ago.

Pork production in the fourth quarter is expected to be near 4,125 million pounds, down 5 percent from a year ago. Annual 1980 production would be a record 16.3 billion pounds, up 7 percent from 1979 and 23 percent from 1978.

A 10-percent reduction in the size of the June–November pig crop will result in a similar reduction in first-half 1981 hog slaughter. However, slaughter in the second quarter of 1981 may be down 10 to 15 percent from a year earlier because of an expected decline in breeding stock slaughter. Also, the September–November pig crop may be down more than 10 percent if the heat of the summer reduced the fertility of boars causing smaller litter sizes.

HOG PRICES NEAR \$50 IN EARLY 1981

The decline in hog slaughter from the levels that were seen this spring has resulted in sharply higher hog prices. Barrow and gilt prices at the markets averaged \$46 per cwt in the third quarter, up from \$31 in the second quarter and \$38 a year earlier. These higher hog prices this summer were above producers cash production costs.

Hog prices averaged \$48 in October as slaughter remained below year-earlier levels. Hog prices will probably be under pressure of large marketings of hogs and broilers in November, but increase again in December. For the quarter, hog prices are expected to average \$45–\$47, up from \$36 a year ago. For all of 1980, hog prices will average about \$40, down from \$42 in 1979 and \$48 in 1978. Net returns to hog producers are estimated to average about \$3 below cash production costs in 1980.

Hog prices are expected to average near \$50 per cwt. in the first half of 1981. These prices would be nearly \$16 above the prices received in the first half of 1980. But, in spite of these higher hog prices, hog producers may still find that returns from hog production are near the cost of production because of higher feed costs. However, if slaughter in the second quarter of the year is reduced because of fewer pigs saved per litter during the September–November quarter, hog prices could be even higher.

DECEMBER–MAY FARROWINGS DETERMINE SECOND-HALF 1981 OUTPUT

Pork production in second-half 1981 is much less certain at this time. Producers still have time to change their production plans in response to changing costs and returns. The slaughter that materializes in the second-half of the fourth-quarter of 1980 will have an impact on hog prices and, consequently, breeding decisions. If hog slaughter were to increase sharply in November and hog prices decline to the low \$40's, producers may revise their production plans downward because returns would be below cash costs. Further increases in feed costs may spur more liquidation, especially for hog-corn producers, where the hog operation doesn't account for a large proportion of farm income. These producers may find selling corn an attractive option to feeding corn to hogs.

The first indication of potential hog slaughter in the second half of 1981 was given by producers on September 1. They intended to decrease December–February farrowings by 7 percent from a year ago.

If these farrowings materialize, slaughter in the third-quarter of 1981 would be down by a similar percentage.

The March-May pig corn crop will supply the bulk of the fourth-quarter 1981 hog slaughter. This pig crop will likely be down 5 to 10 percent, since producers are expected to have little incentive to expand their breeding inventories until returns exceed cash costs. So, expansion of the breeding inventories may not occur until the second-half of 1981.

If the March-May pig crop declines 5 to 10 percent, hog prices are expected to average near \$60 per cwt. in the second-half of next year. These prices would exceed cash production costs for most operators, but may be near the breakeven point for producers that are paying for new facilities. Producers with older, paid-for facilities will likely receive a positive return to their labor and management.

HIGHER RETAIL PORK PRICES LIKELY IN 1981

After declining steadily during the 5 previous quarters, retail pork prices increased 15 percent this summer. Further increases in pork prices are expected for the rest of 1980 and in 1981.

Retail pork prices began to decline in the second-quarter of 1979 as larger supplies of pork came on the market. Prices averaged \$1.48 per pound in the second-quarter of 1979, down from \$1.56 in the previous quarter but still 6 cents above prices a year earlier. Prices continued to decline in the second-half of 1979 and averaged 8 cents per pound below year-earlier levels. For 1979, pork prices averaged \$1.44 per pound, nearly the same as a year earlier.

Pork prices continued to decline through the second-quarter of 1980, when there was a record second-quarter pork production, large supplies of competing meats, a sluggish economy, and seasonal weakness in pork demand. Second-quarter 1980 pork prices averaged \$1.25 per pound, 23 cents below a year earlier. Pork prices rose sharply in the second-half of the year and may average near \$1.50 per pound, about 16 percent above the first-half level. But retail prices in 1980 will average about \$1.40 per pound, 3 percent below the 1979 level.

Further increases in pork prices are expected in 1981 as supplies of pork available for consumption decline. Real growth in consumer incomes and inflation will also boost prices.

Consumption of pork is expected to decline to around 62 pounds per person—retail weight basis—in 1981, down from 69 pounds in 1980, but still about 2 pounds above the 1976-79 average. Beef production may be up slightly next year, but population growth may result in less beef consumer per person. Poultry consumption may increase slightly, but not enough to offset the reduced red-meat consumption, so per capita red-meat and poultry consumption may decline about 3 percent in 1981.

The decline in meat supplies, along with growing consumer incomes and inflation, is likely to cause retail pork prices to increase 25 percent or more in 1981 from 1980 levels. Declining supplies of nonfed beef, which compete very closely with pork products, may result in large price increases for processed meats which would be reflected in pork prices. This contrasts with the previous hog cycle when declining pork production in 1975 was largely offset by increased production of cow beef and nonfed steer and heifer beef. So retail pork prices are expected to increase faster than in 1975.

POULTRY AND EGG OUTLOOK

(By Allen Baker, National Economics Division, Economics and Statistics Service, U.S. Department of Agriculture)

Poultry and egg producers can look forward to higher prices for their products in 1981 even with increased broiler and turkey supplies. Broiler and egg prices may increase 18 to 20 percent and turkeys may increase 10 to 12 percent. However, higher feed and other input costs may limit profits especially in the first half of the year. Consumers will face higher retail prices for poultry as total meat supplies decline and consumers' incomes rise.

BROILERS

Broiler producers have endured trying times during 1980. In the first half of the year, they were caught in a price-cost squeeze as prices were held down by large supplies of poultry and competing meats. Negative returns persisted from the second quarter of 1979 until the third quarter of 1980. Based on preliminary cost estimates, producers had losses of as much as 9 cents per pound in October 1979, and in April 1980, they were losing almost 6 cents per pound. Responding to these conditions, producers planned to reduce broiler output for the last half of the year, but hot weather intervened and lowered production. The unusually hot summer caused a reduced rate of gain, loss of birds, reduced hatching egg supplies, and decreased hatchability. Reduced output of broilers and pork during the summer and a strengthening in demand increased broiler prices and stimulated production. Producers slaughtered fewer hens and probably set smaller-than-normal eggs to increase supplies. Thus, with the large first-half production, the results of these efforts will likely mean 1980 broiler output will be 2 percent above 1979, and another record.

Broiler producers increased output 7 percent from a year earlier in the first quarter of 1980. Production increased 3 percent in the second quarter, but declined 3 percent in the third quarter. Chicks placed had indicated about a 2-percent decline for the third quarter but weather induced bird losses and slowed growth brought output down another 1 percent. Increased egg sets for November and December slaughter should bring fourth quarter output back to year earlier levels even though production was down in October.

Delayed impacts of the hot summer caused the October reduction. Loss of breeder hens reduced the number of eggs available for incubation, and a smaller percentage of these eggs hatched. Producers delayed culling of the remaining hens while adding young hens to the breeding flocks. Therefore, egg sets increased as the breeder flock was rebuilt. In addition, producers probably set smaller-than-normal eggs to increase chick numbers. Producers usually set only large eggs because

the chicks weigh more at hatching and reach market weight with less feed. A reduction in U.S. hatching egg exports provided a final source of additional supplies for the domestic market. In August, these exports were down 39 percent for a year earlier.

During the hot weather, there were some industry reports of losses in the primary breeding flock—the parent birds for the breeding flocks. It takes 6 to 7 months to rebuild the primary breeding flock, and another 6 to 7 months before the hatchery supply flock can increase egg output. Two generations of chickens are required to provide the eggs for broiler production under most cross breeding programs. Thus, losses of birds in the primary flock would limit production increases until after mid-1981. However, August placements of chicks in the breeding flock were down 1 percent from 1979 and September placements were 11 percent greater. This suggests that losses in the primary flock were not serious enough to limit expansion of the breeder flock.

The long period of reduced returns caused broiler producers to reduce the size of their breeder flocks. Broiler type hatchery supply flocks are normally composed of hens 7 to 14 months of age. Thus, cumulative pullet placements 7 to 14 months earlier give an indication of future breeder flock size. These slipped below year-earlier levels in August 1980 and will continue below at least through April. However, producers can continue to delay slaughter of old hens which increases the number of eggs available. The size of the breeder flock may limit the extent that broiler production can be expanded in early 1981.

Given the reduced breeding flock and the increase in costs, especially feed, 1981 broiler output may only expand 3 percent above 1980 rather than 7 to 10 percent, as in the past 2 years. Improved returns this year compared with 1979 have encouraged broiler producers to maintain the level of egg sets during the fourth quarter of 1980. The low profits in 1979 caused reduced egg sets. Thus compared with the 1979 level, broiler producers will likely continue high levels of egg sets into 1981. Broiler output may expand 1 percent above 1980 in the first quarter of 1981 and about equal year-earlier levels in the second. If prices are above production costs especially in the second quarter when demand usually increases seasonally, second half 1981 production could equal first-half production. This would be about 5 percent above 1980's reduced output. However, if feed costs rise more than now expected or broiler prices are lower than expected, second-half 1981 broiler production could be reduced. A more favorable profit situation would encourage producers to increase production.

Broiler prices are expected to strengthen in 1981 as the economy expands and supplies of pork decline. Production costs will exceed prices through the first quarter of 1981. However, prices are expected to exceed costs as broiler producers enter their main marketing periods in the second and third quarters. The nine-city weighted average wholesale price for broilers may average 51 to 53 cents in the first quarter of 1981 and increase to 54 to 56 cents in the second quarter. These prices would be significantly above the 43 and 41 cents of the first and second quarters of 1980. Prices in the second half of 1981 may average 55 to 58 cents, dropping to the lower end of the range as demand weakens in the fourth quarter.

TURKEYS

Except for the second quarter of 1980, turkey production has been profitable since 1977. This has led to expanded turkey output, up 10 percent in 1979 and perhaps another 6 percent this year. The increased production occurred in the first and second quarters, with slight decreases in the last half of the year.

Turkey consumption is changing from a holiday tradition to a year-round habit. In years past, turkeys were predominantly grown, slaughtered, and frozen for consumption during the fourth quarter. In recent years, especially along the east coast, turkeys have been marketed fresh as well as frozen, and have been available year-round. Processed turkey products have also been accepted by consumers and the food service industry. These factors have changed turkey consumption patterns and have increased turkey use during the first three quarters of the year. Fourth quarter turkey consumption has remained relatively stable since 1971, ranging from 3.9 pounds to 4.4 pounds per person. However, per capita consumption has increased about a pound in each of the other quarters during this period, with 1980 increases ranging 11 to 27 percent over last year. Relatively large cold storage stocks of turkey early this year may have contributed to this increase.

At the beginning of this year cold storage stocks of frozen turkeys were 37 percent larger than a year earlier. They were 53 percent greater at the beginning of the second quarter, and were 43 percent above year-earlier levels on July 1. These early year stocks had to be sold before the main market season to provide space for this year's turkeys and to maintain their quality. Under proper conditions, whole turkeys can be safely stored for 6 months to a year without losing quality. Thus, turkeys have been priced attractively and "specialed" by retailers during the year.

The relatively large cold storage stocks of turkey, plentiful supplies of other meats, and the weak economy, resulted in low producers' prices during the second quarter of 1980. Producers responded by reducing the number of turkey poult hatched by 1 percent. Then, the hot summer slowed turkey rates of gain. As a result, slaughter weights were below year-earlier levels in the third quarter and slaughter numbers were also lower. Demand for turkeys remained high and third quarter consumption rose from a year ago. Beginning fourth quarter cold storage stocks of frozen turkeys were down 6 percent from a year ago.

Heavy breed turkey poult hatched in July were 8 percent above a year earlier, bringing the total number available for slaughter in the fourth quarter to near year-earlier levels. Hatchings of light breed turkeys were up also. While the number of turkeys slaughtered in the fourth quarter is expected to equal 1979, slaughter weights may be somewhat lower, so that total production could be about 1 percent less. Higher interest rates, which increase storage costs, are expected to encourage the industry to reduce the carryover of turkey this year relative to 1979. If storage stocks are reduced, per capita consumption in the fourth quarter could equal 1979's 4.3 pounds.

Profitability has increased in the second half of 1980. Despite higher feed prices, turkey prices have also increased, allowing growers to once

again realize positive returns. The improved prospects have encouraged producers to increase the numbers of turkey poult hatched for slaughter in 1981. Compared with a year earlier, hatchings were up 5 percent in August and 12 percent in September. Also, in August, producers reported they'd maintain their breeding flocks at about the same level as this year. With total red meat production expected to decline during 1981, demand for turkey should remain high and production may increase 6 percent from 1980. Output may be 7 percent greater in the first quarter and 8 percent larger in the second.

Demand for turkey usually peaks during the fourth quarter with the Thanksgiving and Christmas holidays. The wholesale price of young hen turkeys in New York may average 78-80 cents per pound, up from 73 cents in fourth quarter 1979. Demand usually declines after the holidays and prices weaken. With the expected increase in production, prices may average 67 to 70 cents in the first half of 1981. This compares with 57 cents during the first half of 1980. Increasing production costs may put turkey producers in a cost-price squeeze in the first half of 1981.

As red meat output declines further in the second half of 1981, meat prices should strengthen. The wholesale price of young hen turkeys in New York may then average 75 to 77 cents per pound. Producer returns should improve, especially if prospects for the grain crop are good.

EGGS

Egg producers were in a cost-price squeeze for most of 1980. During the first half of the year, prices were low. During the second half, rising costs largely offset prices.

Weak demand and large supplies of competing high-protein foods drove egg prices sharply lower in the second quarter of 1980. In May, egg producers lost over 8 cents per dozen. The industry cut output by increasing culling and by force molting more hens. By August, 16.5 percent of the laying flock had been force molted, the largest proportion since October 1975. Force molting reduces egg production immediately, but unlike slaughter, maintains the hens for future production. In this case, producers wanted to maintain their production base for the fourth quarter when demand is generally strong.

Culling of hens was high relative to a year ago during the first half of 1980. As the older hens were culled, the flock became younger and the rate of lay increased from a year earlier through May.

The number of egg-type chicks hatched has trailed 1979 during most of 1980. With a reduced hatch of replacement pullets, the average age of the flock has probably increased during the year because there has been a relative slowdown in the culling of hens since July. However, weekly slaughter of culled hens increased relative to year-ago levels when egg prices dropped below estimated costs of production. Producers seem to be adjusting flock size—and thus egg output—to maintain egg prices which are adequate to cover their costs. With a high percentage of the hens already force molted, producers may not decide to force molt them a second time. Cull hen slaughter levels will probably continue to be a key element in determining egg output in 1981.

The rate of lay has been increasing since 1977. However, with an older laying flock and fewer young birds added, the rate of lay in 1981 may tend to stabilize. Increasing productivity of the laying flock helps hold down cost per egg, but with a leveling off in the rate of lay in 1981, productivity would not blunt the impacts of higher input costs.

Egg production in the fourth quarter of 1980 may decline 1 percent from 1979. Output in 1981 may be 1 percent less than 1980 with most of the reduction occurring in the first quarter and output equaling 1980 in the rest of the year. Recent movements in prices and egg consumption suggest these cuts in output will be necessary to generate price increases that will allow producers to cover production costs.

Egg prices tend to move with prices of other high-protein foods. When prices of meats increase, eggs may become an alternative source of protein. Increased meat demand and low supplies in the second half of 1981 could boost meat prices and give additional strength to egg prices. However, given production lags, egg producers may not be able to quickly increase production to fully meet increased demand.

The price of grade A large cartoned eggs in New York during the fourth quarter of 1980 may average 71 to 73 cents per dozen. Egg prices usually strengthen in the fourth quarter because of increased holiday baking. Unless the increased sugar prices slacken holiday baking, egg prices should strengthen from early fall levels especially with reduced output.

If producers reduce output in the first half of 1981, egg prices will be much stronger than in 1980. Prices may average 76 to 78 cents per dozen in the first quarter, then decline as demand weakens in the spring. Prices in the second half of 1981 may average 79 to 81 cents if the economy improves and demand increases for high-protein foods.

RETAIL PRICES

The retail price index for eggs, as measured by the BLS Index, is expected to increase in the fourth quarter and during most of 1981. Compared with a year earlier, the index may be up 4 percent in the fourth quarter, and range from 18 to 24 percent higher in the first half of 1981.

Even with broiler prices dropping from the third to the fourth quarter, the poultry price index may increase about 15 percent from fourth quarter 1979. In the first half of 1981, the poultry price index may increase about 20 percent, which may be relatively larger than the expected gain in the red meat price index. In the second half of 1981, the red meat price index is expected to rise more than the poultry price index, which may increase about 17 percent.

CATTLE OUTLOOK

(By Dr. Edward Uvacek, Jr., Texas Agricultural Extension Service,
Texas A&M University)

Several aspects of the cattle business seem to stand out as potentially having a great influence on the outlook for the year 1981. First, and probably foremost, is the phase of production, via the cattle cycle, that the industry is actually in. Second, certain important structural changes are occurring which may have a significant impact on the pricing of cattle within the industry. Grouped into a third category, might be the myriad of direct and indirect impacts of a less obvious nature that are having an increasing effect upon the beef industry, such as futures market trading, and, of course, the broad array of Government influences, that is, grading, dietary goals, food programs, and so forth.

CATTLE CYCLE

From a strictly cyclical standpoint, the cattle-raising business seems firmly planted in the buildup of a new cycle. This expansion, which began in 1979, should last about 7 or 8 years. It is during these early years of the cattle buildup that most producers hold back cows, retain heifer calves and generally try to increase the size of their production unit. This, in turn, has a tendency to reduce the number of young animals available for feeding and forces calf prices upward. Since cows, as the basic production unit, become worth more, and the culling of them is much less intense, the price of cows also rises.

It is in these years that ranchers' incomes improve substantially. After a couple of years of such "advertised" better prices and incomes, many new cattlemen enter the business. Whether the original intent is the direct profit motive, or is aimed more toward the indirect economic benefits associated with the tax laws, these cattlemen help accelerate this herd expansion. The ultimate result is usually predictable—eventually overproduction and reduced prices—all probably due by around 1986.

The cyclical cattle numbers pattern ultimately dictates the general price level for cattle and calves. Since it is the calf, however, which serves as the primary income source of the cattle rancher, the price of calves also becomes the real trigger to the cattle cycle duration. As a result, prices received by farmers and ranchers for calves are almost always lower at the peak of the cattle cycle than at the beginning. Since ranchers are also faced with inflationary pressures, it is more revealing to examine these price changes in somewhat of a real dollar sense. For example, at the start of the last cycle, 1967, the average calf price received by farmers and ranchers, deflated by the farmer's

costs of production, was \$26.30 per hundredweight. By the peak of that cycle, in 1975, the deflated price averaged only \$15.11 per hundredweight. This cost-adjusted price drop of 43 percent then stimulated the worst cattle herd liquidation ever recorded in history.

The change in adjusted price from the peak to the next cattle cycle trough, representing the liquidation phase of the cycle, traditionally records a gain. When such increases have been substantial, they are somewhat indicative of the herd buildup which immediately follows. It is, therefore, easy to see why cattlemen began expanding their breeding herds during 1979—the 1975 to 1979 cost-adjusted calf price gain was about 135 percent. (Table 1.)

TABLE 1.—AVERAGE PRICES RECEIVED FOR CALVES
[Dollar amounts per hundredweight]

High and low of cycle	Actual calf prices		Adjusted calf prices	
	Prices	Percent change	Prices	Percent change
1928 (Low)	\$11.70	-38	\$24.89	-17
1934 (High)	7.21	-----	10.60	+7
1938 (Low)	7.92	+64	22.00	+6
1945 (High)	13.00	-----	23.21	+33
1949 (Low)	22.60	-26	30.96	-33
1955 (High)	16.80	-----	20.74	+42
1958 (Low)	25.30	-13	29.42	-20
1965 (High)	22.10	-----	23.51	+12
1967 (Low)	26.30	+3	26.30	-43
1975 (High)	27.20	-----	15.11	+135
1979 (Low)	88.80	-----	35.52	-----

¹ Deflated by prices paid index (total).

Our new year then, 1981, should represent a traditionally high-price year for calves. It undoubtedly, will also be one that serves to stimulate further cattle herd expansion. When both prices and costs are compared, the year could easily be regarded as one of the best from the net-income-per-rancher standpoint.

INDUSTRY STRUCTURE

Numerous structural changes are occurring in the cattle and beef business which might soon be affecting pricing decisions. The number of operations engaged in cow/calf production, cattle feeding, livestock slaughtering, and food retailing have all decreased substantially. Each level, however, shows some diversity in trends.

For example, while the total number of cow/calf farms and ranches has been gradually decreasing, the smaller operations, with less than 50 head, have shown less of a decline. In contrast, small farmer feeders with capacities of less than 1,000 head are disappearing rapidly, as the large commercial feedlots capture the cattle feeding industry. Many of these large lots as custom feeders offer smaller producers the opportunity to realize the economies of size of the commercial feedlot, while retaining ownership of their cattle.

The current structure of the beef industry is a dramatic consequence of the constant adjustments required by each level of the system.

Larger retail food chains demanded consistency in the quality and quantity of their beef. To be competitive and serve these giants, the meatpackers became larger, specialized, and relocated closer to supply sources. The more traditional "major packers," either unable or unwilling to make these adjustments, yielded to independent firms which then grew even more rapidly. This move toward bigness was stimulated by economies of size, increased regulation costs, and a need to achieve productivity gains to offset high labor costs. The result has been a shrinking number of feedlots, more integration, fewer meatpackers, and larger retail food chains. Governmental influences via meat inspection regulations, OSHA requirements and added costs of EPA, all served as a catalyst to make it more difficult for smaller firms to enter, adjust, and compete.

Responding to the increased demand of the larger slaughterers, while at the same time capitalizing upon their own economies of size, commercial cattle feedlots mushroomed in size and number. Acting as a further stimulant to this growth was the development of custom cattle feedlots which captured all of the other advantages, but had the added advantage of transferring risk by using someone else's money for financing the speculative feeding venture. Tax advantages and capital leverage possibilities provided almost unlimited new capital for the expansion of this segment of the industry. Expanded interest by feed companies in development of market outlets, risk reduction, and diversification, appears to be following earlier patterns of investment in broilers and turkeys.

Today, there are only 212 super large feedlots in the Nation with one-time capacities of 16,000 head or more. They are all located within 13 States. By 1979, these 212 lots already accounted for 41 percent of all the cattle feeding in the Nation. (Table 2.) Incidentally, about 50 of these lots and about 20 percent of the Nation's feedlot output are owned by only 20 large firms. It is easy to imagine the change in bargaining power that now exists among such feedlots. This bargaining power can be exercised both with packers and with cattle raisers.

TABLE 2.—CATTLE FEEDING IN SUPER-LARGE FEEDLOTS, 1979

State	Capacity in head 16,000 and over number of lots	Percent of all fed cattle marketings
Arizona	15	
California	27	
Colorado	22	
Idaho	8	
Kansas	32	
Nebraska	15	
New Mexico	6	
Oklahoma	8	
Oregon	3	
Texas	68	
Washington	3	
South Dakota	1	
Iowa	4	
Total	212	
		212 feedlots equals 41 percent.

Consider also these points:

1. The custom feedlot is really in the feed business, not the cattle business. Since their revenue is usually based upon the quantity of feed consumed, they are torn between the desire to maximize their client's gains and the economic realization that the animals will inhale huge additional amounts of feed, if held just a little longer.

2. A recent decision by a district judge in Washington State provided rulings that could have far-reaching effects. In summary, the judge ruled that "custom feeders" are bona fide "agricultural producers"; that frequent phone calls between them constituted "an association of producers" and, as such, attempts at price-fixing would be exempt from antitrust prosecution via the Capper-Volstead Act.

3. Rapidly rising food prices raise another whole specter of questions regarding the response of both consumers and government to rising meat prices. Ironically, the retail beef price of 18 percent from March 1972, to March 1973, triggered consumer boycotts and price controls. The March 1978 price, however, was also 17 percent higher than the year earlier, and the March 1979 price rise was 35 percent greater. The projected increase of cattle prices into the spring of 1981, together with obvious inflationary pressures on the marketing margin, should send retail beef prices soaring again.

Recent controversy with respect to the pricing of meat, combined with industry structural changes, are likely to intensify public concern. The ability of Government to resist direct involvement in terms of increased regulation will be tested, and could be the major industry issue during the next few years.

PRICE FORECASTS

My assessment of 1981 is not too much different from that of Ron Gustafson's and the USDA. While they are looking for a 6-percent gain in beef production during the first calendar quarter of the new year, I am forecasting only about a 1- to 2-percent increase. That, together with substantially lower pork supplies and reduced broiler production compared to 1 year ago, should allow fed cattle prices to move to the mid to high \$70 level. (Table 3.)

Improved consumer demand, and further reductions in competing meat supplies in the second quarter of the year, should yield fed cattle prices in the high \$70's and possibly even into the \$80's. By the July-September quarter, larger beef outputs are expected as a result of feedlot response to the better prices and profits which will obviously be recorded earlier in the year.

Feeder cattle prices will be dictated primarily by fed cattle price levels. Somewhat reduced feeder price premiums are expected because feedlots will be faced with considerably higher feed costs. The normal season pattern of prices for feeder cattle and calves should be complemented by fed cattle price movements and, thus, provide very high spring prices.

TABLE 3.—QUARTERLY AVERAGE CATTLE PRICES
[Dollar amounts per hundredweight]

Quarter	Amarillo choice fed steers, 900 to 1,100 lb		Amarillo choice feeder steers, 600 to 700 lb	
	1979	1980	1979	1980
January to March.....	66.19	67.91	81.05	80.02
April to June.....	73.98	66.89	83.97	68.58
July to September.....	67.18	71.61	78.67	73.17
October to December.....	67.77	1 71.00-73.00	80.10	1 74.00-76.00
	1980	1981	1980	1981
January to March.....	67.91	2 76.00-79.00	80.02	2 80.00-85.00
April to June.....	66.89	2 77.00-80.00	68.58	2 82.00-86.00
July to September.....	71.61	-----	73.17	-----
October to December.....	1 71.00-73.00	-----	1 74.00-76.00	-----

¹ Projected.

² Forecast.

WORLD AND U.S. OUTLOOK FOR DAIRY

(By Clifford M. Carman, Economics and Statistics Service, and Bryant Wadsworth, Foreign Agricultural Service, U.S. Department of Agriculture)

The year 1980 has been both good and bad for the dairy industry—milk production was a record but commercial use declined. Dairy price supports were raised, but, even though USDA purchased over 8 billion pounds of milk in the form of butter, cheese, and nonfat dry milk, manufacturing grade milk prices failed to reach support after March. World production was up and so were stocks.

Potentially, 1981 presents the same type of picture. Milk production will again be at a record level and until commercial use picks up, USDA will continue to remove product from the market. Worldwide milk production will exceed use—thus, stocks will build.

WORLD MILK PRODUCTION HIGHER

For the 36 major milk producing countries, cow's milk production in 1980 is expected to be up about 1 percent from the 1979 total of 386.2 million metric tons. This expansion is the result of increased milk production in the European Community (EC), the United States, Canada, Brazil, and New Zealand more than offsetting lower production in the U.S.S.R., Poland, and Australia. While it is still early, world conditions indicate that production for 1981 will likely be equal to or slightly larger than 1980 output.

Milk production in the EC during 1980 is expected to be up 2 or 3 percent with France (EC's largest milk producer) up over 4.5 percent and the Federal Republic of Germany up about 3 percent. The increases are coming despite the EC's efforts and encouragements to convert dairy enterprises to beef production and the current tax leveled on milk producers. In addition, the overall profitability of dairying this year will likely lead to an increase in 1981 milk output, despite a probable increase in the producers' tax in 1981.

Milk production in Canada this year is likely to be up about 5 percent in response to Federal and Provincial encouragement to expand output. In 1981, Canadian output should increase by about half of the 1980 rate. New Zealand's milk production from June 1979 to May 1980 was up nearly 7 percent, a result of ideal weather. The rate of gain from year-ago levels is expected to abate leaving 1980-81 output up about 4 percent and 1981-82 up slightly from the 1980-81 level. Japanese production in 1980 will likely be up less than 1 percent—a radical departure from the previous 4-year average gain of more than 7 percent per year—and reflects a decline in cow numbers, resulting from an effort to balance supply and demand. An increase in output of about 2 percent is expected for 1981.

Lower milk production in the U.S.S.R. is expected, and reflects quantity and quality problems with roughage supplies earlier this year because of the poor 1979 forage harvest. Milk production from January through September was down about 3.3 percent from 1979, but with better pasture and forage conditions milk output will likely improve for the rest of this year. For all of 1980, production will be down about 2.5 percent, while the outlook for 1981 is for some increased output relative to the low 1980 levels. Meanwhile, Australian output was down 5 percent during 1979-80 (July-June) because of a decline in cow numbers that was precipitated by a severe drought. Output in 1980-81 may recover only slightly.

WORLD DAIRY PRODUCTS—SUPPLY AND USE

Butter production by the 36 major milk producing countries in 1980 is expected to be even with 1979 and increase a little in 1981. Meanwhile, butter consumption for 1980 is expected to be down nearly 3 percent, thus 1980 ending stocks are forecast to increase by about 8 percent. In addition, with only a small increase in consumption likely during 1981, ending stocks for 1981 are expected to be somewhat larger than ending 1980 stocks levels.

Butter production for 1980 will be up about 2 percent in the EC and about 5 percent in Canada, reflecting their increased milk production. Likewise, butter output in the U.S.S.R. will be down 5 percent, reflecting their lower milk production. Meanwhile, butter production in Australia and New Zealand continues to adjust downward because of the increased use of milk to make cheese and because the future of sales to the EC market remains uncertain.

Total 1980 cheese production by the 36 major milk producing countries is expected to be up about 3 percent from 1979 and will likely increase again in 1981. Cheese consumption for 1980 is expected to be up 2 percent, leaving 1980 ending stocks up 1 percent. Most of the 1980 increased production will be by the EC, United States, New Zealand, and Australia, while the U.S.S.R. and South Africa will likely have small declines.

Total nonfat dry milk production by the 36 major milk producing countries in 1980 is expected to increase 3.3 percent, with the gains in production posted by the EC (3.4 percent) and the United States (21 percent), while the U.S.S.R., Australia, and New Zealand will have lower 1980 production of 5, 27, and 9 percent, respectively. Meanwhile, total 1980 consumption of skim milk powder will decline by about 6 percent with the EC, United States, U.S.S.R., and Australia posting usage declines while Mexico's use will be up. Thus, 1980 ending stocks are expected to increase by about 5 percent.

IMPORTS BELOW A YEAR AGO

For the first 8 months of 1980, total imports into the United States on a fat solids basis were 17 percent less than a year ago. Imports of the generally more expensive foreign cheeses for the rest of 1980 will probably continue to be below year-ago levels because of little improvement in consumer purchasing power and because importers will likely not build inventories. Imports for 1981 are expected to return to a

more normal level of about 2.4 billion pounds milk equivalent, as cheese demand is likely to pick up in 1981.

Imports of quota cheese from January to August were 72 percent of 1979, on a product weight basis. Swiss cheese imports were down 22 percent compared with 1979. American-type cheese imports were 84 percent of 1979 levels, while Italian-type cheese imports were about even with year-ago levels. Imports of other dairy products subject to quotas in general were below year-ago levels, except for butterfat mixtures and chocolate crumb (a chocolate-milk solids mixture).

Imports of nonquota cheeses were above year-ago levels through August; however, care must be used, as some applicable data for comparison are lacking. Meanwhile, lactose (milk sugar) and casein imports—both nonquota products—through August were up 75 percent and 3 percent, respectively.

The Trade Agreements Act of 1979, which implemented on January 1, 1980, the results of the Tokyo round of multilateral negotiations, increased U.S. cheese import quotas to 240.1 million pounds. However, the act brought under absolute quotas most of the so-called "price-break" cheeses, which previously had been free of quota. In addition, the act allows foreign nations to subsidize exports into the United States without a counteraction, as long as the prices of such imports do not undercut prices of domestically produced cheese of similar type.

U.S. MILK PRODUCTION HIGHER

The milk production expansion that has prevailed since mid-1979 continued during September as production was up 3.4 percent from 1 year ago. The gain was the result of continued larger than year-ago levels of output per cow and more milk cows. Consequently, the cumulated milk production for the first 9 months of 1980, adjusted for leap year, was 3.2 percent above last year.

The U.S. dairy herd, after being nearly unchanged from January to April, has expanded and continued to do so this summer. September cow numbers stood at 10.876 million, the largest total since February 1978 and 91,000 more than last year. This increase is the result of an influx of a large number of replacement heifers as well as a reduced culling rate. Until recently, the favorable milk-feed price relationships along with relatively low slaughter cow prices have contributed to a reduced culling rate. Adding to the lower rate of culling has been the comparatively favorable income conditions for dairying when contrasted with other farm enterprises and off-farm employment opportunities.

Output per cow during July-September averaged 2.3 percent more than 1 year ago, compared with a year-over-year average gain of 3.5 percent during the July 1979 to June 1980 period. This slowing in output per cow may partially reflect the decline in milk-feed price relationships this summer; the September milk-feed price ratio equaled 1.39, the lowest since July 1977. In addition, the slower rate of gain was measured against the relatively large increase in output per cow during July-September 1979. Also, possibly contributing was the summer heat wave; it may have tempered the level of output per cow in some regions.

Among the various farm production regions, July-September milk production ranged from a year-to-year increase of 8.1 percent in the Mountain States to a decline of 1.8 percent in the Southeast. Meanwhile, in the more important milk producing regions, output in the Pacific was up 6.6 percent, while the Lake States, Corn Belt, and the Northeast had increases of nearly 3 percent. Milk output increased in all five of the major milk producing States—California (7.3 percent), Minnesota (4.0 percent), Pennsylvania (3.0 percent), New York (2.6 percent), and Wisconsin (2.0 percent).

FEED PRICES UP, WILL BE ABOVE A YEAR AGO

The swift runup in feed ingredient prices this summer has been reflected in higher dairy feed prices. The price of 16-percent protein dairy ration was \$188 per ton during September, up \$28 (17.5 percent) from a year ago and \$21 from June. This increase, along with a more stable farm milk price—from \$12.50 in June to \$13.20 in September (up 5.6 percent)—precipitated a rapid decline in the milk-feed price ratio from 1.50 in June to 1.39 during September. The September milk-feed price ratio contrasts with the relatively favorable value of 1.54 a year earlier and the January 1970 to December 1979 average of 1.42.

Late October prices for No. 2 yellow corn at Chicago were quoted at about \$3.50 per bushel, up about \$1 from last year and 75 cents from mid-June. This strength in feed prices has been due to strong domestic use, high export levels during the just-completed 1979-80 crop year, and expectations of a sharp drop in production this year. As of October 1, this year's corn crop for grain was forecast at 6.47 billion bushels, down 17 percent from the record harvest of 1979. This lower level of production, combined with a continued high level of domestic use and higher exports during 1980-81, implies that carryover stocks on October 1, 1981 may be the smallest in 4 years. As a result, corn prices will remain strong through 1980-81.

As for soybean meal, prices at Decatur (44-percent protein) were reported at about \$260 per ton in late October, up \$90 from 1 year ago and \$100 from mid-June. The strong meal prices have been due to relatively heavy meal demand for livestock feeding, and a decrease in soybean crushings this summer. With soybean production forecast at 1.76 billion bushels—down 23 percent from last year's record crop—the price of soybean meal will likely remain near present levels and is expected to average considerably higher during 1980-81. Because of the anticipated higher feed ingredient prices, dairy concentrate ration costs can also be expected to be considerably above year-earlier levels during 1981.

With respect to roughage, production of all hay was reported on October 1 to be down 13 percent from last year (alfalfa hay down 11 percent). Meanwhile, nationwide pasture and range conditions on October 1 were termed to be very poor and only very slightly improved from the August and September ratings. With hay production down significantly (in part due to drought conditions this summer) and increased usage because of supplemental feeding for poor pasture, hay prices have remained strong in recent months. Mid-October prices

received by farmers for baled alfalfa were \$79.10 per ton, about 20 percent higher than a year ago. In addition, given the shortfall in alfalfa and other hay production this year, roughage prices can be expected to remain relatively high through first-half 1981.

BOTH 1980 AND 1981 PRODUCTION TO BE A RECORD

Milk output this fall will likely increase about 2 percent over the fourth quarter last year. Thus, milk production for all of 1980 will be about 3 percent larger than last year's 123.6 billion pounds, and the largest on record, topping the previous high of 126.97 billion pounds in 1964. Although gains in productivity per cow have eased this summer, the expansion of the dairy herd has insured this year's production will be an all-time high.

Despite a likely increase in farm milk prices during 1981, the expected higher feed prices will probably preclude the milk-feed price ratio from reaching the levels that prevailed from late 1977 through the first half of this year. This would tend to inhibit large gains in output per cow in 1981.

The outlook is much less certain for cow numbers next year. Current indications are that a large number of replacement animals are available, which means that even with a normal culling rate the present dairy herd can be maintained. In addition, with the support price just raised on October 1 and another increase mandated on April 1, 1981, many dairy operations may consider the income potential of their marginal cows enough to offset much higher feed costs and increases in other production expenses, and therefore continue their current low rate of culling.

On the other hand, with a smaller supply of processing meats (hogs and nonfed cattle) expected next year along with higher feeder cattle prices (which would keep more beef breeding stock off the slaughter market), utility cow prices can be expected to be considerably higher in 1981. The combination of higher feed prices, higher cull cow prices, and the forthcoming debate over dairy price support legislation could act in concert to limit further expansion in cow numbers next year, or even revive the historical downward trend.

Thus, on balance, the less favorable milk-feed price relationships will limit gains in productivity per cow. However, milk cow numbers are almost certain to be above year-earlier levels for most of 1981. Therefore, milk production gains can be expected to continue during 1981, although the rate of increase is likely to subside, leaving 1981 output up 1 to 3 percent—again a record high level.

PRICES TO CONTINUE UP IN 1981

During the 6-month period ending in September, manufacturing grade milk prices failed to reach the \$12.36 support level (at 3.67 percent fat; \$12.07 at 3.5 percent fat) established April 1, 1980. After adjusting for fat content, manufacturing-grade prices averaged about 41 cents under the support level, with September's price still 11 cents below support. This shortfall for support can be attributed to reduced competition among manufacturers because of the large supplies of

milk and slackened demand for dairy products that have characterized 1980. In addition, the oversupply situation slackened the pace of increases in the price received by farmers for all milk. For example, in September the all-milk price was reported to be \$13.10 per 100 pounds, up about 6½ percent from last year and 5 percent from the season low in June. This contrasts with the 13-percent year-to-year gain in the all-milk price posted in September 1979.

Milk production is now seasonally declining, but supplies of milk for all uses will more than likely be plentiful in coming months. Thus, although commercial stocks of butter and American cheese are below year-earlier levels, manufacturers of these two primary dairy products may be able to meet trade needs with their fall production because of an expected large supply of milk. However, a strong increase in commercial use, or a slowdown in butter and cheese production could result in tight commercial stocks, which would strengthen prices. On balance, it appears likely that manufacturing-grade milk prices for the October–March period will average closer to support than during the spring and summer of 1980. Thus, for the rest of 1980 and first quarter 1981, the all-milk price will strengthen due to the relatively improved manufacturing milk price, the seasonal rise in fat content, and the seasonally higher proportion of class I usage. For the rest of 1981, the farm milk prices will be a function of the mandated April 1, 1981 support price increase, the supply of milk, and its demand.

Under the Agriculture Act of 1949, as amended, the support price of manufacturing-grade milk for the marketing year that began October 1 was set at the minimum required level of 80 percent of parity—\$12.80 per 100 pounds of milk containing 3.5 percent fat. In addition, a provision of the current amendment requires that a midmarketing year adjustment be made in the support price. Thus, the \$12.80 will be adjusted on April 1 to reflect the reported change in the index of prices paid by all farmers from mid-September 1980 to mid-March 1981. Therefore, given that any change in the support price influences the farm price of milk, we can conclude that for all of 1980, the all-milk price will average 8½ to 9 percent higher and in 1981 will be up about a tenth.

Wholesale prices of dairy products advanced during late summer as the trade anticipated the October 1 higher support purchase levels, such that prices of butter and American cheese were above the April–September USDA purchase prices, while the price of nonfat dry milk was at the support level. During October, wholesale American cheese prices (40-pound blocks, Wisconsin assembling points) averaged 141.18 cents per pound, about 15½ cents higher than the January average, while butter prices (Chicago, grade A) averaged 147.06 cents per pound—about 2 cents below support but 17 cents higher than the January level. Nonfat dry milk prices (Central States, high heat) at the end of October were about 93.5 cents per pound—under support by about one-half cent, but a dime higher than at the beginning of the year.

With commercial stocks of butter more than a quarter below a year ago on October 1, wholesale butter prices would normally be expected to strengthen as stocks are drawn down seasonally. However, the expected large production of butter this fall and the 105-percent sellback

policy by USDA will limit upward price movement. For 1981, butter price advancements will closely parallel the advancements in support price levels, unless commercial use picks up. Meanwhile, even though commercial stocks of American cheese are also below last year, any price strength this fall will be due to an upswing in sales from the sluggish pace that has characterized this year so far. In 1981, because of higher meat prices, American cheese use should be improved and thus the wholesale price may advance above the support price. However, the 105-percent sellback policy will limit the upward climb.

During September, the Bureau of Labor Statistics index of retail dairy prices stood at 230.6 (1967=100), up 9.1 percent from a year ago and up 5.6 percent from January. Both higher farm milk prices (up 6.5 percent from last year) and an increase in farm-to-retail marketing costs contributed. Through the first 9 months of 1980, retail dairy prices averaged 10 percent above last year and will likely average a tenth higher for the year. In 1981, retail dairy prices are expected to advance again, averaging 10 to 12 percent higher than in 1980.

COMMERCIAL USE

Commercial disappearance of milk and dairy products during the first 8 months of 1980 was down 1.6 percent from year-earlier levels on a milk equivalent basis. The lackluster performance was the result of the weak general economy and low meat prices. With a decline in their purchasing power, meat prices below year-ago levels, and higher dairy prices, consumers probably substituted some pork and poultry for dairy products in their foodmarket basket.

Looking at the major uses of milk, the year-to-year decline of dairy product use has seen butter down 4.5 percent, American cheese down 5 percent, fluid sales down 0.6 percent and nonfat dry milk down 19 percent. Meanwhile, other types of cheese use through August was up 1.2 percent, while ice cream sales were up 2.5 percent and cottage cheese sales were up 1.5 percent.

Commercial use of dairy products for the rest of this year and for 1981 may be more buoyant as the rate of meat price increases will make dairy products (cheese) relatively more attractive to consumers. On the other hand, further increases in retail dairy product prices, the current general economic outlook of relatively high unemployment, and reduced spendable income may hold back any large gains in use.

COMMERCIAL STOCKS

Commercial stocks of dairy products this summer were below year-earlier levels for the first time since early 1979. Industry holdings of milkfat were down a tenth from last year on October 1, while stock levels held by the industry was due to an expected high level of production this fall. Thus, the industry moved relatively large quantities to CCC this summer, because of weak sales, high storage costs, and the USDA 105-percent sellback policy, and, in part, because of large stock holdings last year. Commercial stocks of butter were down 25 percent, while American cheese holdings by the industry were down about a tenth, and nonfat dry milk stocks were off about a fifth.

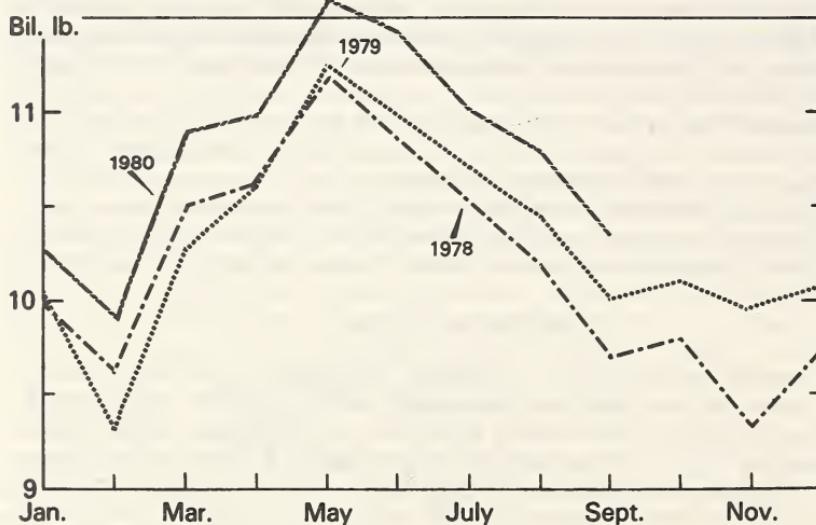
Even if commercial use remains soft this fall, industry stock levels will likely remain relatively tight. This is because any excess product will likely be moved to USDA, given the high cost of storage (including interest) and the current sellback policy.

USDA PURCHASES LARGE

Purchases under the price support program by USDA during the first 9 months of 1980 on a milk equivalent fat basis totaled 7.35 billion pounds, compared with 1.31 billion in 1979, and were about 7.7 percent of estimated farm marketings of all milk. Through September, butter removals were 207.6 million pounds, compared with 56.3 million pounds a year ago. American cheese purchases totaled 307.5 million pounds, compared with only 12.1 for the same time period in 1979. As has been the case in the past, proportionately more nonfat dry milk than butter was purchased by USDA—524.2 million pounds through September (nearly three times the amount from January to September compared with 1979). In addition, the purchase picture has not changed any yet—during October, USDA removed all three products from the market in amounts greater than in 1979. Furthermore, with gains in milk production expected to continue—and until commercial use picks up—USDA will continue to purchase butter, cheese, and nonfat dry milk. However, as 1981 unfolds, the purchase of butter and cheese may slacken.

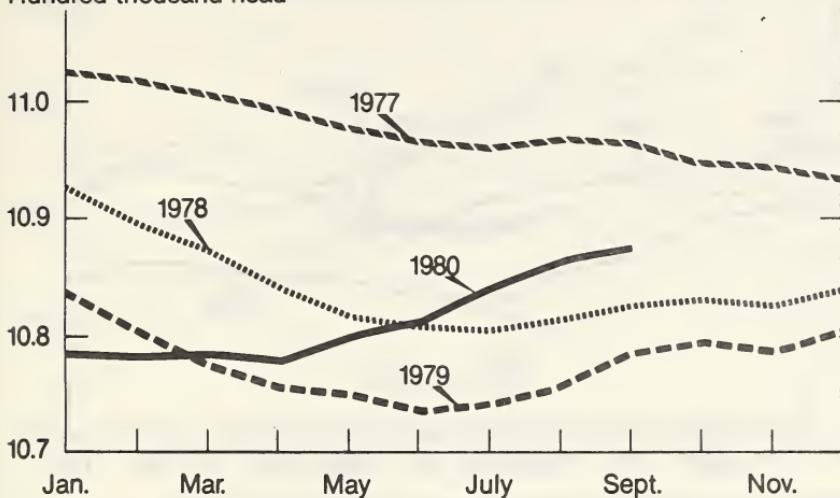
CURRENT SITUATION CHARTS

U.S. Milk Production by Months



Milk Cows on Farms

Hundred thousand head



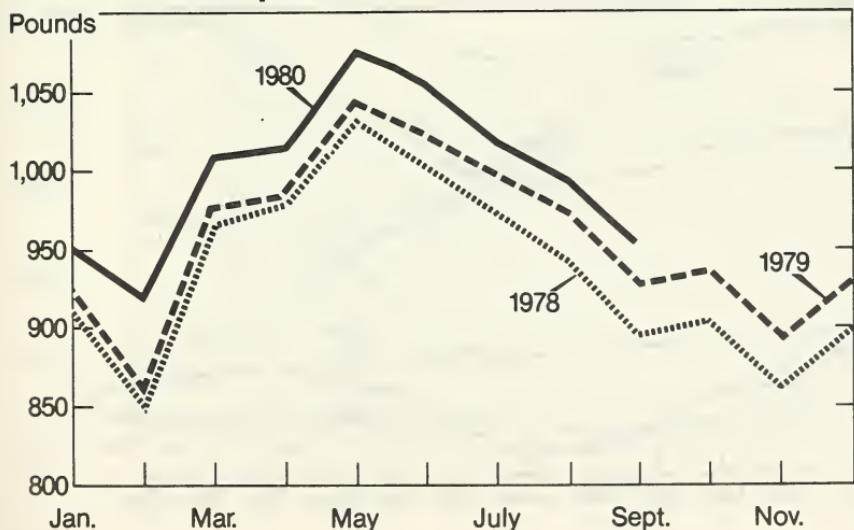
USDA

Neg. ESS 262-80(11)

FIGURE 2

Milk Production per Cow

Pounds

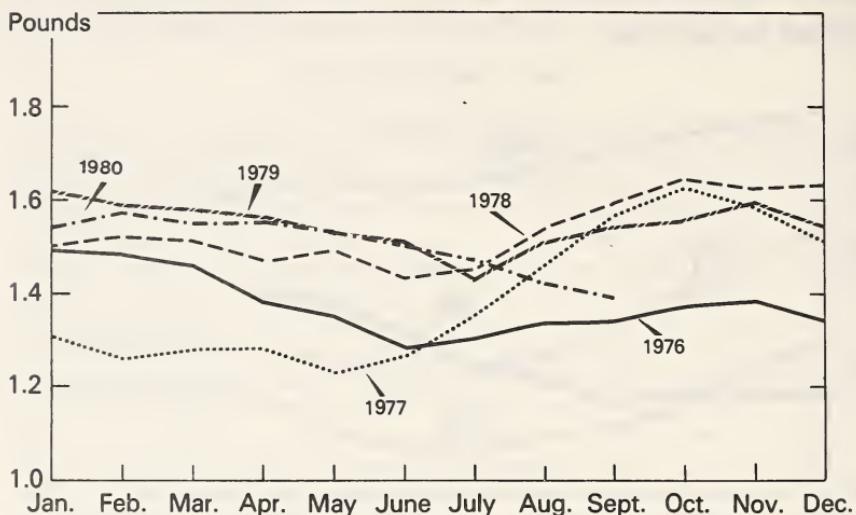


USDA

Neg. ESS 261-80(11)

FIGURE 3

Milk-Feed Price Ratio*



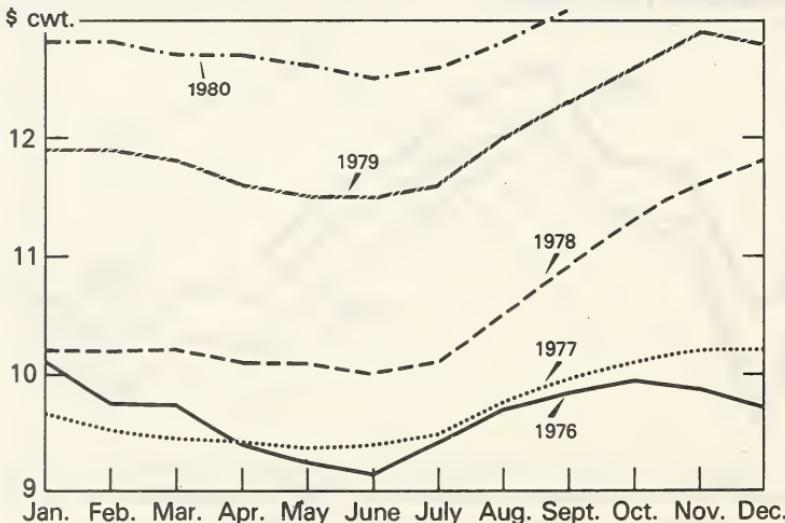
*Pounds of 16% protein ration equal in value to one pound of milk sold to plants and dealers.

USDA

Neg. ESCS 40-80(11)

FIGURE 4

Milk Prices*

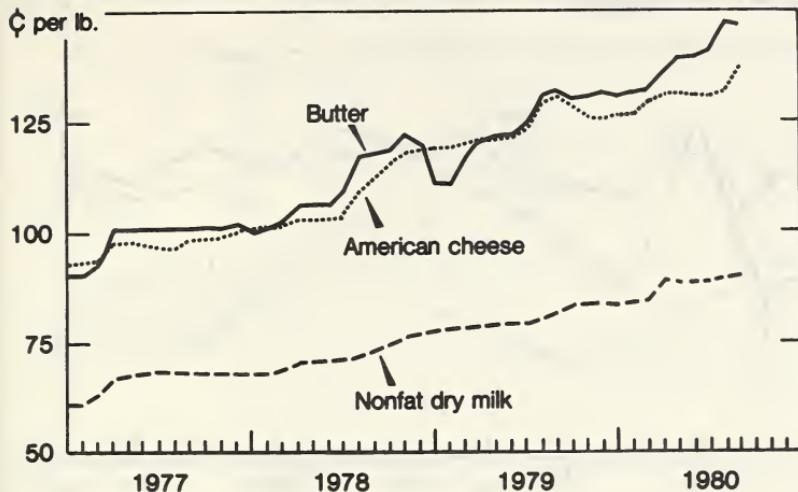


*U.S. average price received by farmers for deliveries to plants and dealers.

USDA

Neg. ESCS 5449-80(11)

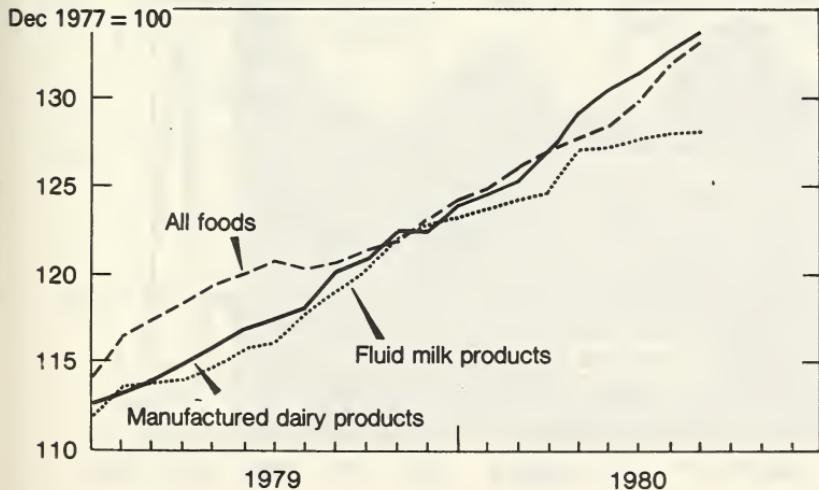
FIGURE 5

Wholesale Dairy Product Prices

USDA

Neg. ESCS 79-80 (11)

FIGURE 6

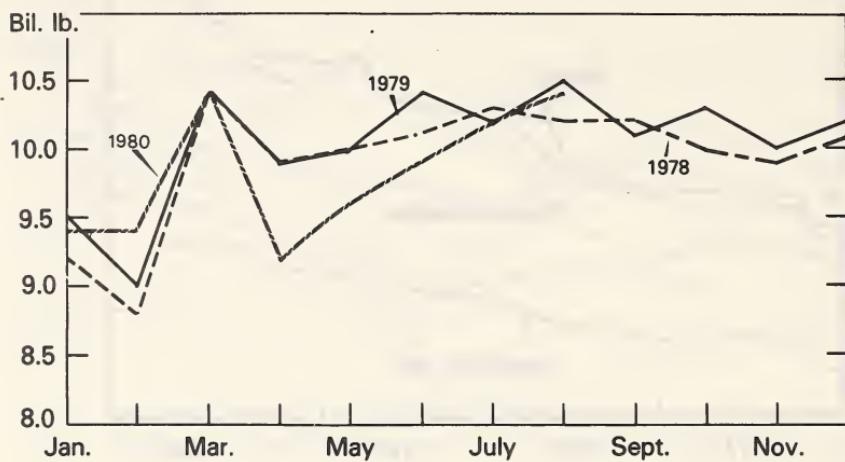
Retail Food and Dairy Product Prices

USDA

Neg. ESCS 38-80 (11)

FIGURE 7

Commercial Disappearance of Milk in All Products*



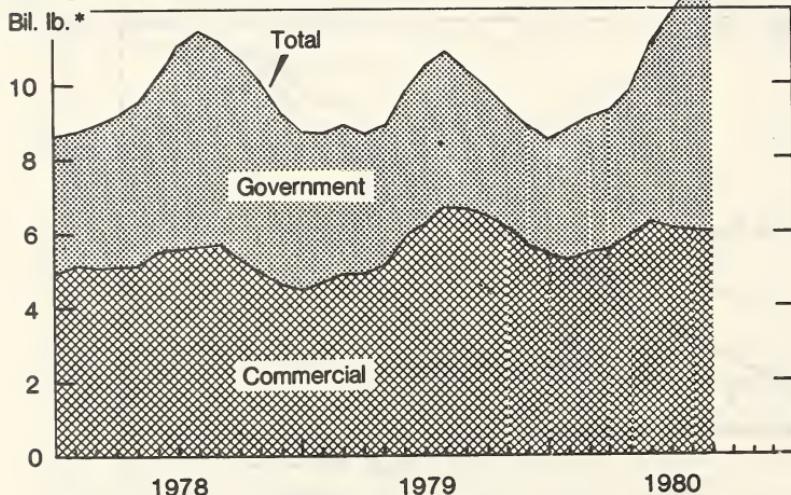
*Milk equivalent.

USDA

Neg. ESCS 2075-80(11)

FIGURE 8

Dairy Product Stocks°



°As of first of month.

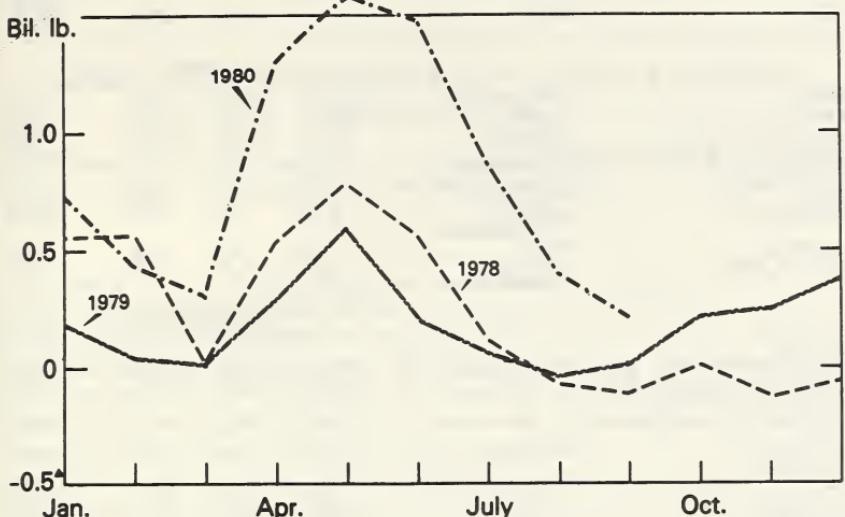
Milk equivalent, fat-solids basis.

USDA

Neg. ESCS 8448-80 (11)

FIGURE 9

USDA Dairy Product Purchases*



*Net removals, milk equivalent, fat-solids basis.

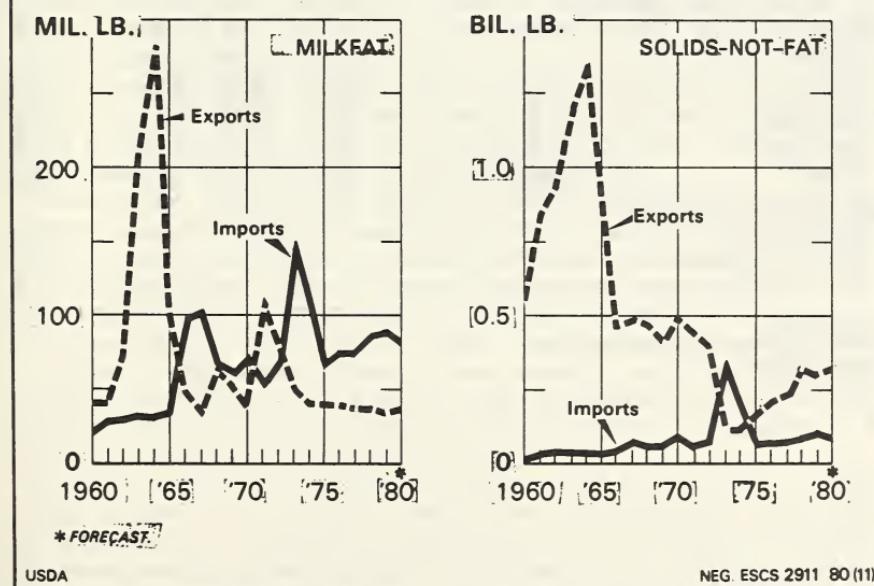
▲Negative figures denote domestic sales exceeded purchases.

USDA

Neg. ESCS 8449-80(11)

FIGURE 10

DAIRY IMPORTS AND EXPORTS



* FORECAST

NEG. ESCS 2911 80(11)

FIGURE 11

TABLE 1.—DAIRY SUMMARY, 1978-80

Item	Unit	1978	1979	1980	Percent change 1979-80
Annual ¹					
Milk production.....	Billion pounds.....	121.6	123.6	127.7	+3.3
Milk per cow.....	Pounds.....	11,218	11,471	11,813	+3.0
Number of cows.....	Thousands.....	10,841	10,777	10,810	+0.3
Milk prices received by farmers.....	Dollars per hundredweight.....	10.60	12.00	13.00	+8.3
Manufacturing grade.....	Do.....	9.71	11.10	11.95	+7.7
Cash receipts.....	Million dollars.....	12,722	14,750	16,500	+11.9
Value of dairy rations.....	Dollars per hundredweight.....	6.08	6.68	7.40	+10.8
Milk-feed price ratio.....	Pounds.....	1.53	1.54	1.46	-5.2
Utility cow prices, Omaha.....	Dollars per hundredweight.....	36.71	50.10	46.40	-7.4
January to September					
Wholesale prices:					
Butter (Chicago, Grade A).....	Cents per pound.....	106.85	120.03	136.64	+13.8
American cheese (Wisconsin assembling points, 40-lb blocks).....	Do.....	103.66	122.85	130.53	+6.3
Nonfat dry milk (manufacturers' average).....	Do.....	70.21	78.71	87.14	+10.7
Dairy products (BLS).....	1967=100.....	184.6	208.6	227.6	+9.1
USDA net removals:					
Butter.....	Million pounds.....	122.1	56.3	207.6	+268.7
American cheese.....	Do.....	39.7	12.1	307.5	+2,441.3
Nonfat dry milk.....	Do.....	269.7	187.2	524.2	+180.0
Evaporated milk.....	Do.....	13.0	12.8	11.8	-7.8
Milk equivalent.....	Do.....	2,942	1,311	7,351	+460.7
Retail prices (BLS): ²					
All foods.....	1967=100.....	209.2	232.8	251.3	+7.9
Dairy products.....	1967=100.....	182.9	204.3	224.8	+10.0
Manufactured products output:					
Butter.....	Million pounds.....	779.6	746.8	865.8	+15.9
American cheese.....	do.....	1,595.8	1,676.5	1,793.2	+6.8
Other cheese.....	do.....	1,063.5	1,132.6	1,167.0	+3.0
Nonfat dry milk.....	do.....	773.8	722.2	918.9	+27.2
Canned milk.....	do.....	613.1	618.5	562.7	-9.0
Cottage cheese.....	do.....	670.6	642.7	641.4	-2.2
Ice cream.....	Million gallons.....	640.5	636.3	652.5	+2.5
Ice milk.....	do.....	252.3	240.8	234.5	-2.6
Imports of dairy products: Total milk equivalent ³	Million pounds.....	1,264	1,230	1,022	-16.9
Commercial disappearance:					
Total milk ³	do.....	78,713	79,309	78,525	-1.6
Butter ³	do.....	581.6	590.0	563.5	-4.5
American cheese ³	do.....	1,380.2	1,395.3	1,325.3	-5.0
Other cheese ³	do.....	1,051.8	1,107.0	1,120.8	+1.2
Canned milk ³	do.....	483.3	483.4	440.9	-8.8
Nonfat dry milk ³	do.....	442.7	420.7	340.5	-19.1
Cottage cheese.....	do.....	670.6	642.7	641.4	-2.2
Ice cream.....	Million gallons.....	640.5	636.3	652.5	+2.5
Ice milk.....	do.....	252.3	240.8	234.5	-2.6
Average daily sales in urban markets:					
Fluid whole milk ³					-4.1
Fluid low-fat milk ³					+3.9
Cream and cream mixtures ⁴					+2.0
Total fluid products ³					-9

¹ 1980 estimated.² For all urban consumers starting January 1978.³ January to August.⁴ January to July.

THE ACCOMPLISHMENT OF DAIRY PROGRAM OBJECTIVES

(By Emerson M. Babb and Robert D. Boynton, Department of Agricultural Economics, Purdue University)

Current views of the effectiveness of dairy programs cover a wide range. Some believe that current programs are working well. Some think there are temporary or transitory problems which require, at most, fine-tuning of current programs. Some think the current situation requires drastic alteration or abandonment of current programs. In the absence of an understanding as to whether we have a problem, a discussion of alternative policy approaches may not be very productive. It is easy for the current situation to shape one's perceptions of the problem and one's views toward programs. For this reason, we decided to devote our attention to a consideration of what existing dairy programs have brought us in the past 10 years. We believe a longer run assessment of program consequences is a necessary foundation for instituting policy changes. We will thus focus on an assessment of (1) the extent to which programs have accomplished stated objectives during the 1970's and (2) factors which adversely affected accomplishment of those objectives.

Another reason we elected not to discuss alternative dairy policies is that this has been thoroughly done in recent reports [3, 4, 6, 7]. The consequences of alternative price support policies were projected into the early 1980's in three reports [8, 9, 10]. While these three studies were designed to compare the consequences of alternative policy approaches, as opposed to projecting actual results, the 1980 projected results under 80 percent of parity were rather accurate. The current dairy situation should not have come as a surprise.

Performance of the dairy industry is influenced by a number of programs and policies including Federal milk marketing orders, dairy price supports, restrictions on dairy produce imports and policies toward cooperatives. All of these programs and policies have been under fire at one time or another, but the critics have been more numerous and more vocal during the 1970's. During the 1970's, the debate on Federal orders was intense. More recently, attention has been focused on the dairy price support program. Given the current and prospective costs of that program, it will likely be the centerpiece of dairy policy debate in the immediate future.

That the dairy price support program will occupy this central position in the 1980's is further justified by the dominance it has held over other dairy programs in the past decade. Consequences of other dairy programs, such as Federal milk orders, have mostly been the result of support price actions [3]. Yet a great deal of effort has been spent on tilting with windmills during this period, diverting attention

away from the one program which has been the fountainhead of performance in the dairy sector—the price support program. While its importance in the decade of the 1970's has been so crucial, the price support program has had a strong influence on dairy policy for several decades. Consider that the average market price for manufacturing grade milk has exceeded the support price by more than 10 cents in only 15 of the past 30 years [9]. We think the evidence clearly shows that the current dairy situation is more a product of the price support program than of other dairy programs. For this reason, we have chosen to emphasize it here. Other programs are discussed only to the extent that they are affected by the support program.

ACCOMPLISHMENT OF OBJECTIVES

The Agricultural Act of 1949, which created the dairy price support program, specified three objectives: (1) to assure an adequate supply of pure and wholesome milk to meet current needs, (2) to reflect changes in the cost of production, and (3) to assure a level of farm income adequate to maintain production capacity sufficient to meet anticipated future needs [4]. Other objectives which are often mentioned for dairy policy, which apply to Federal milk orders and at least indirectly to the support program, are: (1) to stabilize prices and production, and (2) to increase efficiency and orderly marketing. We now provide some assessment of the extent to which each of these five objectives were accomplished during the 1970's.

Adequate supply

In the 1970's production was at times inadequate and at other times excessive. USDA removals on a milk equivalent basis varied from 1.2 to 7.3 billion pounds during 1970-79 (table 1). They will be over 8 billion pounds this year. Net Government expenditures varied from \$31.4 to \$709.8 million during 1970-79 [1]. Expenditures were about \$1.3 billion for the fiscal year ending September 30, 1980. We have seen a reversal this year of a long-term downward trend in cow numbers. During 1973 and 1974, imports of dairy products were greatly expanded due to high retail dairy product prices caused by low levels of domestic milk production. The support program cannot be given high marks for generating only an adequate supply.

Federal orders also have the objective of assuring an adequate supply of milk, but many milk orders have excessive milk supplies. This can be attributed to price support policy. Federal order price increases since 1968 have been induced by price support actions [9]. While differentials applied to the basic formula price in Federal orders have been constant, the basic price, which is directly influenced by support price actions, increased 147 percent during 1969-79. Federal orders cannot balance production and consumption in the face of price support policies which generate excessive supplies [3].

Cost of production

Costs of milk production on a national basis are available only for 1974-79. During this time, total cost of production increased from \$9.01 in 1974 to \$10.50 in 1979 or by 16.5 percent [5]. Support prices were increased over 50 percent during this period. Other evidence that support prices did not reflect changes in production costs are con-

tained in table 2. Net income from dairy farming varied from $-\$0.62$ per hundredweight in 1974 to $\$1.89$ in 1980. It appears that price supports were low relative to production costs in 1973-75 and were high relative to production costs in 1978-80.

Level of income

During the 1970's, the support program has not prevented dramatic swings in dairy farmers' income. We have seen years when income was inadequate and others when it was more than adequate (table 3). Family income from dairying in the past decade probably reached its low point in 1974. In that year, the $\$4,842$ family income from dairying for a farm with 48 cows was below the threshold poverty level for a family of four ($\$5,038$). Off-farm income may have brought the average dairy farm family up to or above the poverty threshold. At the other extreme, family income from dairying in 1980 for a 54 cow herd ($\$28,983$) will exceed the income of the average nonfarm family. This farm-nonfarm difference would be wider if off-farm income were added. The price support program has not achieved its dairy farmer income goal during much of the 1970's.

Price and production stability

Milk prices trended up throughout the 1970's (table 1). When adjusted for inflation, the average price for manufacturing milk increased 26 percent. There were only brief periods of price stability. Production varied from 115.3 to 123.6 billion pounds and there were two production cycles during the 1970's. Production will exceed 127 billion pounds this year. A more stable production would have been desirable from a public standpoint.

Retail prices for dairy products during the 1970's were slightly more stable than were the prices for all food and the consumer price index (CPI). The increase in the retail dairy price index during 1969-79 was also slightly less than the increase for all food and for the CPI. The minutes of labor required to purchase dairy products during the 1970's were relatively constant.

Efficiency

The price support program has probably induced desirable technical change. In recent years, however, it has been responsible in large measure for the commitment of excessive resources to dairying. Prices have been set above longer run equilibrium levels.

In addition to the current excessive levels of production overall, there are efficiency problems related to the location of milk production. The cost-price changes during 1974-80 have provided a strong incentive for increased milk production in all regions [2]. Increased production outside of the Upper Midwest has resulted in some costly movements of excess grade A milk to manufacturing facilities; for example, from Pennsylvania to Minnesota and from California to Utah. There has also been construction and expansion of facilities to process excess grade A milk into manufactured products in areas which will not be able to support those facilities when production more nearly matches consumption. There has essentially been no change in price relationships among regions during 1974-80, just a large increase in the level of price [2]. The price support program is thus responsible for most of the increased spatial inefficiency.

Summary

The 1970's was a decade in which there was low achievement in dairy policy objectives. We do not know the extent to which the policy objectives would have been achieved in the absence of the price support program. While we cannot blame the policy successes or failures on that program alone, it must bear some responsibility for the less than desired performance in the dairy sector. Beyond this, the support program was clearly unable to cope with the many shocks that adversely affected achievement of objectives.

REASONS FOR LOW ACHIEVEMENT

There are probably many factors that contributed to the low achievement of dairy policy objectives in the 1970's. We identify some of these factors for purposes of assessing obstacles to goal accomplishment in the 1980's.

Natural causes

During the 1970's, there were droughts, corn blights, shortfalls of grain production in other countries, and other uncontrollable events which introduced shocks to the dairy sector. There is no indication that these shocks will be less frequent or less severe in the 1980's.

Other agricultural policy

Farm programs for grains and some other commodities were dramatically changed in the 1970's. The new programs were more market-oriented and introduced more volatile feed prices to the dairy sector. Commodity price relationships among commodities likewise became more variable. Shocks to the dairy sector from this source may be more severe in the 1980's.

Macroeconomic policies

Foreign currency exchange rates, inflation, two recessions, tax policy, trade policies, energy policies, and the like have all had major impacts on the dairy sector. In fact, these events probably had greater impacts on the dairy industry than did dairy programs. After the wild 1970's, it is hard to visualize another 10 years of such dramatic change. But we may have more crises, disruptions, and macroeconomic policy changes in the 1980's than in the 1970's. The dairy industry has traditionally focused almost exclusively on dairy programs and policies. Events of the 1970's suggest that the industry will need to broaden its interest to include policies in other sectors of agriculture and to those relating to the general economy.

Parity formula

The current parity formula which guides price support decisions does a poor job of reflecting forces which affect production and consumption. For example, there is poor correspondence between the cost structure of dairy farms and items in the parity index. Feed costs are about half of the total cost of milk production, but are given a weight of only 12 percent in the parity index. Such incongruities lead to poor correspondence between a particular parity percentage and a particular supply-demand relationship in the dairy sector. Indeed, under varying conditions, the support price as a percentage of parity

which would balance production and consumption may range from 70 to 85 percent. The range could even be greater.

If the parity formula was only a guide to support price decisions, the current procedure might have better odds of achieving desired performance. But, parity prices are value-laden and contain strong political undercurrents. Even if decisionmakers had greater flexibility in setting support prices, it may be politically infeasible to set them at 70 or at 85 percent of parity, if such levels were appropriate. The disparity between the parity formula and factors that affect the dairy sector will not narrow in the 1980's.

Lack of flexibility

During much of the 1970's, minimum price supports at 80 percent of parity were mandated by Congress. Some have felt that program results would have been more favorable had there been greater flexibility in setting support prices. This may be true. The results for the last 25 years, however, do not indicate whether the Congress or the Secretary of Agriculture is in a better position to exercise an increase in flexibility. In some respects, the question turns on whether human judgment or mechanical formulas can do the better job in setting support prices. Perhaps a combination of human judgment which is disciplined by a trigger mechanism of the type under consideration this year deserves more attention. Given the adjustment lags in the dairy sector and the shocks from outside the sector, it is unreasonable to suppose that any system of setting price supports will approach perfection.

CONCLUDING COMMENTS

Most of the factors which gave rise to problems in achieving dairy policy objectives in the 1970's will carry over into the 1980's. As a consequence, there is no basis for believing that performance of the dairy sector will be improved in the 1980's if current programs are continued without change. In addition, the current public mood demands that programs have a greater market orientation. We believe there will be a continuing need for dairy programs which will accomplish public policy objectives. The challenge to design dairy programs that effectively cope with instability while increasing the exposure of prices to market forces will be formidable. But, it is time to search for new approaches which better achieve policy objectives in the face of instability and shocks.

There is a strong interrelationship among dairy programs. This is recognized to some extent, but administration of the programs will require greater coordination. The administration of dairy programs will also require greater knowledge of how nondairy policies and external events will interact with dairy programs. Dairy programs have always seemed unduly complex and mysterious to those outside of the dairy establishment. Now, the tables are turned. The dairy establishment will have to gain a better understanding of what makes the rest of the economy tick.

We strongly believe that the dairy price support program dominates other dairy programs. This has been true in the past and will continue to be the situation in the 1980's. The design of that program must be carefully examined and modified to insure that 10 years from

now we will be giving high marks to dairy policy and programs in the 1980's.

TABLE 1.—DAIRY PRODUCTION, CONSUMPTION, REMOVALS, AND PRICES, 1969-79¹

	In billion pounds			Manufacturing milk		Retail dairy price index ⁵
	Production	Consumption ²	Removals ³	Average price	Percent of parity ⁴	
1969	116.1	113.2	4.5	\$4.45	86	106.7
1970	117.0	113.2	5.8	4.70	85	111.8
1971	118.6	113.9	7.3	4.86	82	115.3
1972	120.0	115.9	5.3	5.08	80	117.1
1973	115.5	115.5	2.2	6.20	91	127.9
1974	115.6	114.0	1.3	7.13	78	151.9
1975	115.3	115.4	2.0	7.63	84	156.6
1976	120.6	116.7	1.2	8.56	82	169.3
1977	122.7	118.2	6.1	8.70	80	173.9
1978	121.6	120.4	2.7	9.65	80	185.6
1979	123.6	122.6	2.1	11.10	76	207.1

¹ Source: E.S.C.S. "Dairy Situation", U.S.D.A.

² Domestic disappearance for civil consumption.

³ Milk equivalent removals by U.S.D.A.

⁴ Average manufacturing milk price during marketing year as a percentage of parity equivalent.

⁵ Retail price index for dairy products, 1967=100.

TABLE 2.—PRICE, COSTS AND INCOME PER HUNDREDWEIGHT OF MILK, AVERAGE U.S. DAIRY FARM, 1974, 1977, AND 1980¹

Item	1974	1977	1980 ²
Milk price received	\$8.39	\$9.77	\$13.22
Total cost ³	³ 9.01	10.55	13.07
Less: income from cull cows and calves	4 NA	(.85)	(1.74)
Total net cost	9.01	9.70	11.33
Net income	(.62)	.07	1.89
Additions to net income:			
Unpaid operator and family labor	1.04	1.50	1.81
Management ⁴	.56	.69	.86
Family income from dairying	.98	2.26	4.56

¹ Source: Economic Research Service, "Cost of Producing Milk in the United States," Committee on Agriculture, Nutrition, and Forestry, U.S. Senate, committee print for 1976, 1979, and 1980.

² Projected.

³ Total cost excluding land allocation plus land allocation for dairy farm lots based on current land values. Feed prices are based on prices received by farmers.

⁴ Adjusted indirectly through inclusion as hundredweights of milk produced in 1974.

⁵ Based on 7 percent of dairy sales in 1974 and 7 percent of total cost in 1977 and 1980.

TABLE 3.—DAIRY FARM PRODUCTION AND INCOME FOR 3 HERD SIZES, UNITED STATES, 1974, 1977, 1980

Item	1974	1977	1980 ¹
Milk production/cow (hundredweight/year) ²	102.93	111.94	117.92
Herd size (number of cows):			
Small	20	20	20
Average ³	48	50.5	53.9
Large	80	80	80
Gross dairy sales (amount/year): ⁴			
Small	\$17,271	\$23,776	\$35,282
Average	\$41,452	\$60,035	\$95,084
Large	\$69,087	\$95,104	\$141,127
Family income from dairying (amount/year): ⁵			
Small	\$2,017	\$5,060	\$10,754
Average	\$4,842	\$12,776	\$28,983
Large	\$8,070	\$20,239	\$43,017

¹ Projected.

² Source: Dairy Situation, ESCS. USDA.

³ Based on 1974 "Cost of Producing Milk in the United States" and adjusted to other years by the reported number of cows and number of farms. Herd sizes are for commercial farms and not all farms reporting milk cows.

⁴ Income from the sale of milk, cull cows, and calves.

⁵ Family income from dairying is computed as the per hundredweight family income from dairying in table 1 multiplied by the production per cow and number of cows per farm. The family income from dairying does not include income from off-farm sources.

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OUTLOOK FOR TOBACCO

(By Robert H. Miller, Agricultural Economist, Economics and Statistics Service, and Kenneth A. Howland, Deputy Director, Tobacco, Cotton, and Seeds Division, Foreign Agricultural Service, U.S. Department of Agriculture)

The U.S. tobacco outlook for 1981 is highlighted by uneven supplies while utilization prospects may stabilize. This year's crop recovered from last year's 36-year low, but still falls short of prospective use. Burley loan stocks have been sold. The sizable Flue-cured loan stocks contain very limited quantities of better leaf grades. Carry-over of Flue-cured and burley underquota marketings from the 1980 crop may exceed a year ago, but the size of the prospective 1981 crop depends primarily on USDA quota decisions due by December 1 (Flue-cured) and February 1 (burley and other kinds). The tobacco price support and marketing quota program is authorized by permanent legislation so there is no required agenda for tobacco legislation when the new farm bill is hammered out next year.

U.S. CIGARETTE SALES STABLE

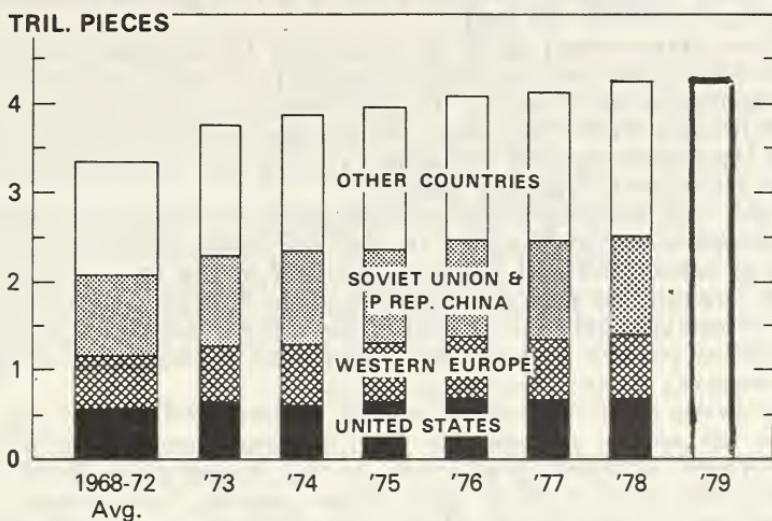
Cigarettes remain the key to how much tobacco is used in the United States and in most other countries. U.S. cigarette output should reach a record high level of 708 billion pieces this year, about 4 billion above 1979. Sales of low tar cigarettes (15 milligrams of tar or less) are rising to offset declines for other categories.

As the smoking age population continues to increase, U.S. smokers may smoke a few more total cigarettes even though consumption per person, 18 years and over, may decline slightly in 1980 to around 194 packs or 3,880 cigarettes. Measured in terms of nicotine and "tar" content of the smoke, and tobacco weight, per capita consumption has declined at a faster rate than indicated by the number of cigarettes.

Antismoking publicity and legislation continue to affect the industry. About three-fourths of the States and many cities and counties have laws that either prohibit smoking in certain places or segregate smokers from nonsmokers. The U.S. Department of Health and Human Services and voluntary health agencies continue their efforts to discourage smoking. The cumulative effect on total smoking is uncertain, although it may account for some of the downturn in per capita consumption.

WORLD CIGARETTE OUTPUT

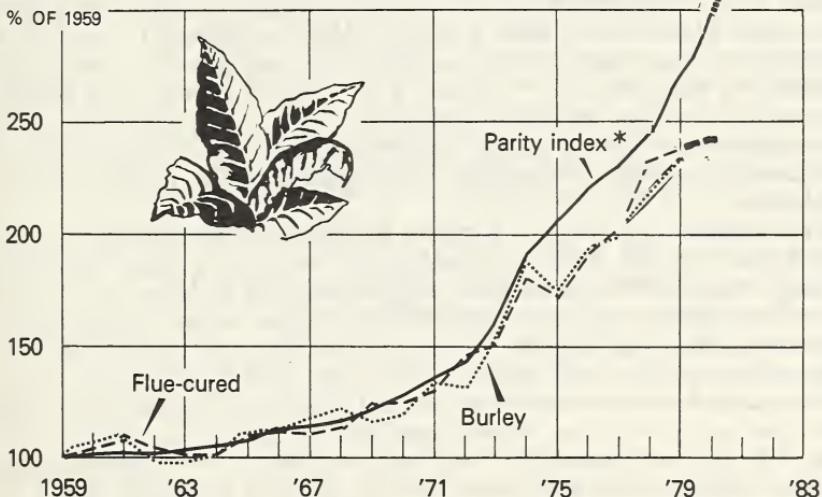
TRIL. PIECES



USDA

Neg. ESCS 2324-79 (9)

TOBACCO PRICES AND PARITY INDEX



* PRICES PAID FOR ALL ITEMS INCLUDING INTEREST, TAXES, AND WAGE RATES.

USDA

NEG. ESCS 782-78 (9)

Wholesale cigarette prices, wholesale-retail margins, and retail prices rose in 1980. January, May, and November rises in wholesale prices and rising retail margins mean an 8- or 9-percent rise in retail cigarette prices for the year.

Three States raised excise taxes in 1980. Direct excise taxes vary from 2 cents per pack in North Carolina to 21 cents in Connecticut, Massachusetts, and Florida. The combined city and State tax is 23 cents in New York City. Since the passage of the contraband cigarette law 2 years ago, tax collections are down in North Carolina and up in a number of high tax States.

Cigar and smoking tobacco consumption is trending downward. Consumption of large cigars in 1980 will total about 4 billion, 8 percent below 1979 and less than one-half of the 1964 peak. Small cigar consumption may stabilize around the 1979 total of 1.5 billion. Use of smoking tobacco in 1980 is down 3 percent to an estimated 38 million pounds, a record low. Next year, consumption of cigars and smoking tobacco may drop further.

Smokeless tobacco output is gaining. Chewing tobacco output may reach 109 million pounds this year, 6 percent more than in 1979. This year's indicated total would be the largest since 1945. Snuff output may show a slight gain. These tobaccos have gained from restrictions on smoking as well as from advertising and promotion.

EXPORT QUANTITY STABLE: VALUE STILL RISING

The value of U.S. exports of tobacco and tobacco products in 1980 may gain one-tenth from last calendar year to around \$2.35 billion. The value of unmanufactured tobacco exports will do well to reach the record level of \$1.36 billion in 1978, but tobacco products will probably reach \$1.05 billion, with a steady volume of cigarette exports. In recent years, leaf and product exports have taken about four-tenths of the U.S. tobacco crop. This year U.S. tobacco exports will register about a \$1.85 billion surplus over tobacco imports of \$500 million. This favorable trade balance, along with strong sales of other agricultural products, is helping to offset the U.S. trade deficit in nonagricultural products.

Unmanufactured tobacco exports in 1980 may gain slightly from 1979's total of 568 million pounds (257,000 metric tons) in export (dried) weight. The farm sales weight was 664 million pounds last year. Crop quality is not as desirable this season; some foreign buyers maintained their takings by dipping into dealer and loan stocks. Foreign takings of leaf will be held down next year by price and tax increases, a slowdown in consumption, and adequate stock levels in major manufacturing countries. World cigarette production is gaining about 1 to 1½ percent annually, but the preference for American-type blended cigarettes means above-average growth prospects for Flue-cured and burley tobaccos. In our major market, the European Community, takings of U.S. tobacco are ahead of 1979. Japan's purchases may remain reduced, but purchases by other Asian markets are on the upswing.

World tobacco output this year may total about the same as the 12.4 billion pounds (5.38 million metric tons) in 1979. Output gains in United States, Canada, the Soviet Union, South Korea, and Poland are about offset by declines in Brazil and India.

Imports accounted for almost one-third of U.S. manufacturers' tobacco utilization last year (27 percent for cigarettes and 50 percent for cigars and chewing tobacco). Oriental cigarette leaf is the principal kind imported but other kinds of leaf and scrap have become large. Since July, some of the tobacco previously classified as "other scrap tobacco" has been classified as "tobacco manufactured or not manufactured, not specifically provided for." Cigarette tobacco imports for factory use this year may edge up to around 325 million pounds. This includes 125 million pounds of scrap and 20 million pounds of Flue-cured and burley leaf. Cigar imports are mainly filler tobacco and this year will probably total about the same as the 44 million pounds of last year.

TOBACCO CROP MAKES PARTIAL RECOVERY

The most notable development for U.S. producers in 1980 was the very hot, dry growing season that reduced the quality of the Flue-cured crop and limited burley production. All tobacco acreage was up one-eighth and, yield recovered 4 percent. But production remained below the 1969-78 average.

Overall, there is a 17-percent larger crop (November estimate). A 9-percent higher support level applies, but grower price averages may rise at a slower rate. Still, cash receipts are expected to total 20 to 25 percent higher than 1979's reduced level. Higher input prices pushed tobacco production costs up about 18 percent from 1978.

Even with the larger 1980 crop, the reduced carryover means total supplies for the 1980-81 marketing year are down about 1 percent from last year. When burley markets open later this month, prices may rise to an alltime high, surpassing the 1979 record of \$1.45 per pound. The 1980 burley support level exceeds the 1979 market average, and even with sales of loan stocks, the crop falls short of disappearance.

At the beginning of the 1980-81 marketing year, tobacco held under Government loan (uncommitted) totaled 541 million pounds (farm sales weight, about 75 million below a year earlier. The reduction was largely in burley; however, for Flue-cured, the increased volume of loan receipts from this season's Flue-cured crop was greater than sales of older crops held in loan. Most of the remaining Flue-cured consists of less desirable grades that may require price reductions in order to sell. Prices of most of these tobaccos exceed the cost of comparable filler tobaccos from other countries.

Government price support is mandatory for tobacco produced under marketing quotas. The legal formula requires that price support levels for eligible tobaccos go up about 11 percent next year over 1980. The increase results from a rise in the parity index which is the measure of changes in prices paid by farmers, including wages paid to hired labor, interest, and taxes. The price increases for major production inputs plus the sizable carryover of underquota marketings into 1981 may again put downward pressure on lease rates.

For Flue-cured tobacco, the small carryover and larger crop mean about the same size supply in 1980-81 as last year. This season USDA maintained the Flue-cured quota. With acreage and yields larger, growers are selling about 13 percent more than in 1979.

The 1980 Flue-cured auction has just ended with a record average of \$1.45 per pound, 5 cents above a year ago, even though quality was off from the 1979 season due to the weather extremes. Also, large loan holdings and several unsupported grades moderated the average return to growers.

Under the acreage poundage program, USDA is required to announce the national marketing quota for Flue-cured tobacco by December 1, 1980. The 1980 quota was 1,095 million pounds, or equal to prospective use. With use now believed to have fallen, supplies equal about 2.9 year's use compared with the desired supply of 2.4 years, according to the legislative formula. The effective quota for 1981 will increase from the basic quota because below-quota marketings exceed overquota marketings in 1980.

The 1980-81 supply of burley tobacco is 4 percent below last season. Carryover on October 1 was one-seventh below a year ago. This year's crop is one-fourth over last season, as acreage is up 16 percent and yields are up 7 percent.

Burley disappearance was maintained in 1979-80 with stable domestic use and exports. Burley sales benefit from the shift to low-tar, low-nicotine cigarettes. Carryover stocks next October 1 may decline further.

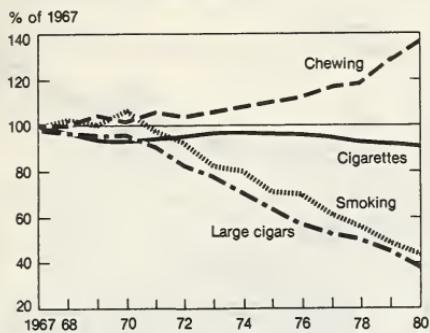
Burley poundage legislation requires that the national quota be not less than 95 percent of estimated disappearance for that year. With disappearance around 620 million pounds for the past 3 years, and supply sharply reduced, the 1981 burley marketing quota could be set slightly above this season's 615 million pounds. The 1981 farm quota will be increased by the production shortfall from this year's quota.

Supplies of southern Maryland, Flue-cured, Dark Air-Cured, and Cigar wrapper tobaccos are smaller than last season. Cigar binder supplies are larger, while filler supplies are about the same.

U.S. cigarette manufacturers used an estimated 1.27 billion pounds of tobacco (unstemmed processing weight) in cigarettes in 1979. This was about 4 percent above the year before, as output gained.

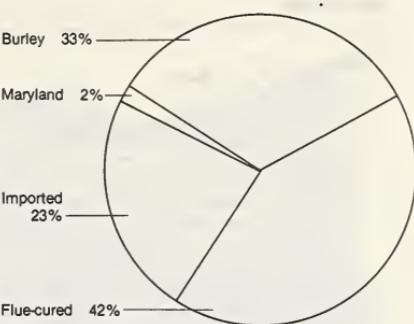
The 1979 world tobacco crop is estimated at 5.43 million metric tons, 3 percent below the 1978 output. U.S. tobacco production dropped 22 percent below the 1978 level. Early indications suggest a recovery in 1980 world tobacco production because of increased area and more favorable growing conditions. Effective quotas have been increased for the 1980 crop in the United States, and Canada and Mexico are both expected to harvest larger crops. African output is expected to increase, and most other areas will harvest at least as much tobacco as they did in 1979. Brazil's 1980 Flue-cured crop is the largest on record.

Consumption of Tobacco Products



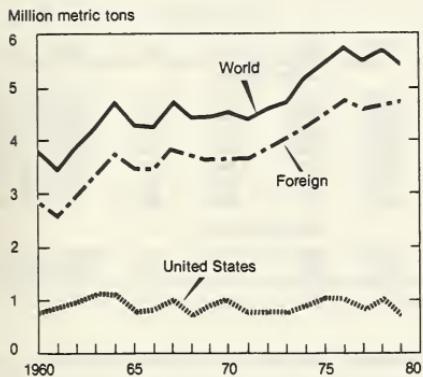
Per male 18 years and over; except cigarettes, per person 18 years and over. 1979 preliminary, 1980 forecast.

Tobacco Use in Cigarettes

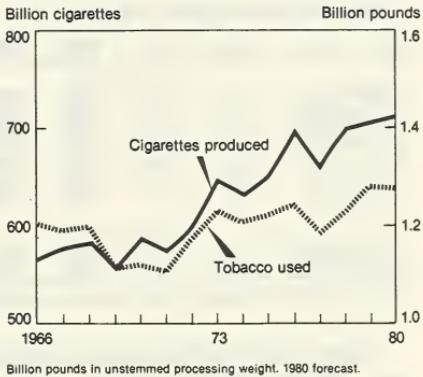


1977-79 average.

Unmanufactured Tobacco Production



Cigarettes Produced and Tobacco Used

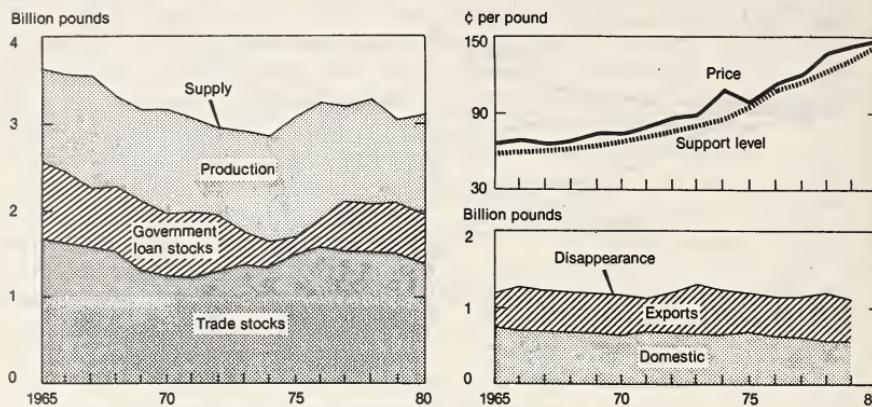


Billion pounds in unstemmed processing weight. 1980 forecast.

A larger Flue-cured tobacco crop is bringing the 1980/81 supply above last season's low level. Flue-cured acreage for harvest is estimated at 12 percent above 1979, as growers were allowed to make up the 1979 production shortfall. Despite the drought, yields are expected to have recovered as well. To reduce the price support outlays, USDA eliminated the support this season on several grades in excess supply.

This year's tobacco supply is about 2.8 times the size of last year's use, and well above the desired ratio based on legislative formula. Carryover next July will rise slightly. Through September, with about two-thirds of the crop sold, grower prices averaged \$1.45 per pound, 5 cents above last season. The relatively high U.S. price tends to restrict domestic use and limit exports and encourage imports.

Flue-Cured Tobacco: Supply, Price, Use



Trade stocks include manufacturers' and dealers'. Crop year beginning July 1. 1979 preliminary, 1980 forecast.

Flue-Cured Tobacco: Supply, Price, Use

	1973	1974	1975	1976	1977	1978	1979	1980
<i>Million pounds</i>								
Supply	2,908	2,852	3,066	3,214	3,199	3,258	3,048	3,088
Marketings	1,159	1,245	1,414	1,316	1,124	1,206	974	1,130
Trade stocks	1,347	1,331	1,472	1,539	1,518	1,518	1,510	1,390
Loan stocks	402	277	180	359	557	534	564	568
Use	1,301	1,200	1,193	1,148	1,147	1,183	1,090	NA
Domestic	703	652	671	634	608	584	580	NA
Exports	598	548	522	514	539	599	510	NA
<i>Cents per pound</i>								
Average price	88.1	105.0	99.8	110.4	117.6	135.0	140.0	NA
Support level	76.6	83.3	93.2	106.0	113.8	121.0	129.3	141.5

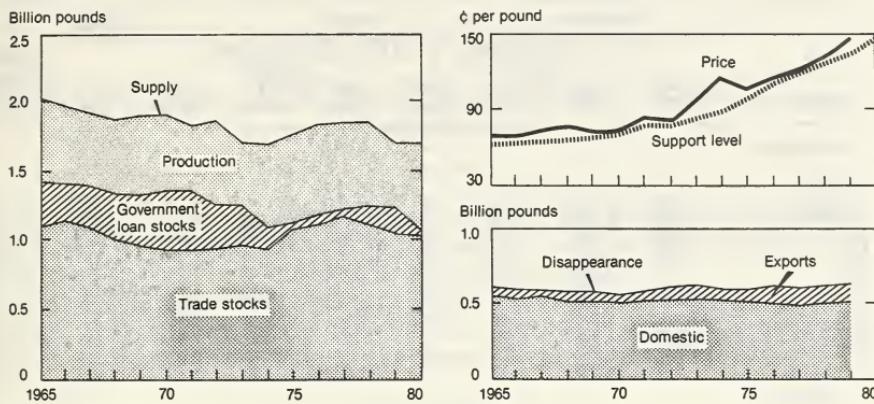
NA = Not available. Crop year beginning July 1; 1979 preliminary, 1980 forecast.

Domestic burley tobacco use continues below the 1964 peak as a result of leaf efficiencies by cigarette manufacturers and a decline in the use of other tobacco products. Brisk demand for American-type blends abroad about offsets the reduced domestic use of recent years.

The 1979 crop was the smallest since 1943, reflecting reduced acreage and lower yields. With a smaller carryover, the tobacco supply for 1980 is about 5 percent below last year. Prospective supply is about 2.6 times the expected use, about the desired level based on legislative formula.

The 1980 crop falls short of estimated use; loan stocks had been completely sold by October 1. The support level for the 1980 crop is \$1.46 per pound, 9 percent above the previous season.

Burley Tobacco: Supply, Price, Use



Trade stocks include manufacturers' and dealers'. Crop year beginning October 1. 1979 preliminary, 1980 forecast.

Burley Tobacco: Supply, Price, Use

	1973	1974	1975	1976	1977	1978	1979	1980
<i>Million pounds</i>								
Supply	1,691	1,681	1,734	1,824	1,830	1,836	1,684	1,684
Marketings	461	610	640	664	613	618	472	630
Trade stocks	953	932	1,082	1,116	1,162	1,105	1,056	1,024
Loan stocks	277	139	12	44	55	113	155	30
Use	619	587	603	617	609	624	630	NA
Domestic	532	519	511	500	493	503	500	NA
Exports	87	68	92	117	117	121	130	NA
<i>Cents per pound</i>								
Average price	92.9	113.7	105.6	114.3	120.0	131.2	145.2	NA
Support level	78.9	85.8	96.1	109.3	117.3	124.7	133.3	145.9

NA = Not available. Crop year beginning October 1; 1979 preliminary, 1980 forecast.

TABLE 1.—FLUE-CURED AND BURLEY TOBACCO: MARKETING QUOTA AND MARKETINGS, 1971-80

[In million pounds]

Year	Quota		Marketings			Effective under quota ¹	Net carryover ²
	Basic	Effective	Actual	Over-quota	Under-quota		
Flue-cured, types 11-14:							
1971	1,071.6	1,069.9	1,076.3	60.4	49.9	45.8	-14.5
1972	1,071.2	1,056.7	1,022.1	41.2	72.9	68.1	26.8
1973	1,178.7	1,205.6	1,159.0	54.8	100.5	95.3	40.5
1974	1,296.6	1,337.1	1,245.3	50.0	138.9	132.4	82.5
1975	1,491.4	1,572.3	1,414.6	50.9	203.2	192.3	141.0
1976	1,268.1	1,409.1	1,316.0	49.4	139.9	130.2	80.8
1977	1,116.5	1,197.3	1,124.2	42.6	115.2	106.9	64.3
1978	1,117.2	1,181.5	1,205.9	65.6	43.9	41.8	-26.4
1979	1,094.9	1,068.5	973.8	24.8	118.8	117.0	92.2
1980 ³	1,095.0	1,187.0					
Burley, type 31:							
1971	555.1	553.0	471.5	9.7	91.1	89.7	80.1
1972	531.5	611.5	588.6	30.7	45.7	44.6	13.9
1973	559.7	573.6	460.7	11.3	113.1	111.7	100.3
1974	606.5	706.8	610.4	23.0	118.9	104.0	81.0
1975	669.5	750.4	639.9	21.8	127.5	113.4	91.6
1976	634.8	726.4	663.6	33.1	96.2	82.3	49.2
1977	636.2	683.4	612.6	27.2	99.0	80.8	53.6
1978	614.2	667.8	614.2	31.5	88.2	67.6	36.1
1979	613.6	649.7	472.2	12.2	188.6	168.8	155.2
1980 ³	615.0	769.2					

¹ Under quota marketing less ineligible carryover.

² Effective under quota marketings less over quota marketings.

³ Subject to revision.

Source: Compiled from records and reports of Price Support and Loan Division, ASCS.

TABLE 2.—UNITED STATES AND WORLD PRODUCTION AND EXPORTS OF FLUE-CURED, BURLEY AND ALL UNMANUFACTURED TOBACCO, 1955-79

[In million pounds, except percent]

Period	Flue-cured			Burley			All tobacco		
	United States	World total	United States as percent of total	United States	World total	United States as percent of total	United States ¹	World total	United States as percent of total
PRODUCTION²									
Average:									
1955-59	1,208	2,914	41	486	595	82	1,941	8,519	23
1960-64	1,336	3,302	40	624	778	80	2,211	8,898	25
1971	1,078	3,918	28	473	868	55	1,712	9,865	17
1972	1,012	4,076	25	601	1,094	55	1,754	10,155	17
1973	1,157	4,404	27	450	944	48	1,744	10,670	17
1974	1,241	4,788	26	613	1,113	55	1,994	11,385	18
1975	1,415	5,100	28	639	1,240	52	2,186	11,837	18
1976	1,316	5,021	26	679	1,294	52	2,140	12,284	17
1977	1,130	4,938	23	617	1,295	48	1,916	12,015	16
1978	1,231	5,261	23	626	1,324	47	2,028	12,359	16
1979 ²	945	4,965	19	446	1,228	36	1,550	12,075	13
EXPORTS³									
Average:									
1955-59	413	683	60	28	47	60	550	4,143	35
1960-64	397	772	52	42	74	57	497	4,169	30
1971	342	831	41	36	128	28	473	4,1,890	25
1972	425	1,046	41	54	175	31	606	4,2,341	26
1973	418	1,088	38	59	210	28	613	4,2,288	27
1974	441	1,232	36	61	265	23	662	3,116	21
1975	391	1,214	32	62	231	27	571	2,854	20
1976	379	1,217	31	68	258	26	587	2,912	20
1977	412	1,226	34	79	291	27	640	2,794	23
1978	455	1,331	34	91	319	29	707	3,099	23
1979 ⁴	371	1,306	28	82	313	26	567	3,028	19

¹ Includes Puerto Rico.² Farm-sales weight.³ Unmanufactured, export weight.⁴ Total excludes Sino-Soviet countries. Foreign data supplied by the Tobacco and Cotton Division, Foreign Agricultural Service.⁵ Subject to revision.

1981 OUTLOOK FOR TOBACCO

(By A. Frank Bordeaux, Jr., Chief Economist, North Carolina Department of Agriculture)

First, I would like to compliment Robert Miller and Kenneth Howland for a comprehensive review of the current situation in tobacco and for their outlook projections for 1981.

I will comment briefly on the outlook suggestions they have presented. In addition, as we move on into the 1980's I think it is appropriate to comment on some of the longer term aspects of tobacco.

OUTLOOK

Without reviewing all of the numbers which they presented, I think it is significant to note that the two major types of tobacco, Flue-cured and burley have both made some recovery from the very short 1979 crop.

Considering the difficult production conditions which were reflected in crop quality the Flue-cured market was reasonably strong. The \$1.45 season average for Flue-cured has already been noted as has the current supply estimate of 2.9 year's use.

With burley production estimated at 555 million pounds, total supply is lowest since 1951. With relative strength in exports this past season there will be a tendency toward a "one-price" market with a small differential for grade differences. Growers will probably push for increased quota in 1981 if they experience a strong market. Legislative statutes prevent cuts in burley quota greater than 5 percent in any year. There probably will be some resistance to large increases in quota because of the inability to make large reductions in quota if subsequent production increases are too great.

CONTINUING PROBLEMS

Now turning to some perennial problems which sometimes take a new twist. These general areas of domestic consumption, program concerns, and foreign markets cover most of the general problems being observed today.

DOMESTIC CONSUMPTION

The authors have correctly characterized the domestic consumption trend as stable in the short run since per capita consumption will not be increasing. Any sales increase will come as a result of a greater smoking age population. Various antismoking programs will continue to cut into demand expansion in the domestic market for cigarettes.

PROGRAM CONCERNS

In their quest for increased efficiency in the use of machinery and other capital assets, tobacco farmers (especially Flue-cured) have been extremely competitive with each other in the allotment rental market.

Two factors will put downward pressure on allotment rental rates this year. Below-quota marketings exceed over-quota marketing in 1980 leading to a larger effective Flue-cured quota in 1981. This will reduce pressure on finding enough allotment. Secondly, the anticipated 11-percent increase in price support levels can be viewed as a floor price below actual market price in good years. With Flue-cured farmers production expense characteristics, their expenses probably will increase by more than 11 percent. This will place downward pressures on rents unless growers are not willing to take a lower rate of return on their management and labor. It is not likely that they will be willing to push themselves to the limit in bidding for allotment.

The 1980's may bring renewed interest in multicounty allotment renting or sale of allotment. Producers will be facing increasing pressure to mechanize production operations to achieve cost efficiency. As a result they will be interested in reducing uncertainty in relation to available allotment.

FOREIGN MARKET

It is interesting to note that the United States actually has had a slight increase in exports in the world market if you look at the long term trend. However, our percentage of the world market has decreased steadily in recent years and the actual increases in exports may be ending.

Several long term questions emerge. Growth in consumption in the developed countries is slowing. We have traditionally done well in these countries with our exports. Recently, multilateral trade agreements reduced import duties on U.S. tobacco entering the European Economic Community by one-third. If we do not see some improvement of our export position in the EEC we should be concerned.

The second aspect for consideration is will the "American" blend emerge as a dominant preference in the less developed countries? The greatest expansion in cigarette consumption is being experienced in these countries. This may be the remaining trade expansion area. Perhaps the trade problem is at least partially a matter of failure to expand into new markets with U.S. tobaccos rather than losing market share in our traditional markets. This problem merits additional consideration by the industry.

The factors discussed above as well as increasing attention to chemical residues in some markets bring us back to the central question of quality and product identification for U.S. tobaccos being essential to long run survival in the export market.

A larger number of countries are producing a more sophisticated tobacco for the international market, placing increased challenges to the United States for export markets.

China, as the world's largest tobacco producer, is a topic which cannot be adequately dealt with in our time frame today. Although the tobacco currently grown in China is not viewed as a threat to U.S. tobacco, it is only a matter of time before China attempts to earn badly needed foreign currency through tobacco exports. This is a long term development problem for them. Whether or not they will be able to produce substantial quantities of quality tobacco for export remains to be seen.

CONCLUSION

In conclusion, the 1981 outlook for tobacco producers looks better than it has in some previous years. The longer run outlook is still clouded by failure of domestic consumption to expand, foreign demand uncertainty, and increased competition for exports in the world market, and producer problems with conflicts between greater production efficiency and tobacco quality.

OUTLOOK FOR TIMBER PRODUCTS

(By Robert B. Phelps, Forest Service, U.S. Department of Agriculture)

The demand for timber products is largely determined by the levels of activity in several important end-use markets. So before discussing demands for the various products, I would like to review briefly trends in these markets and take a look at current estimates of their strength this year and early in 1981.

DOMESTIC MARKETS

As the third quarter of 1980 ended, the various measures of economic growth were sending somewhat mixed signals about the overall strength of the economy and its prospects in the last quarter of the year and in 1981. However, on balance, most appeared to indicate a continuing moderate recovery, although increases in construction and perhaps some other timber products markets may be constrained somewhat by interest rates.

The gross national product, a measure of the Nation's total output of goods and services, and the most comprehensive measure of total economic activity grew at about a 1 percent annual rate (measured in 1972 dollars) in the third quarter of 1980. This was a sharp reversal of the 9.6 percent decline recorded in the second quarter. In addition, personal consumption expenditures and final sales of goods and services were also up. Increases late in the third quarter in a number of economic indicators including new orders for durable goods, personal income, and industrial capacity utilization suggest continued growth later in the year. But because many increases were relatively small and interest rates and inflation remained high, most economists forecast a somewhat slow recovery in the fourth quarter, with continued modest growth in 1981.

A key determinant of the demand for many timber products is construction activity, and most particularly, residential construction activity. Housing is the Nation's most important market for softwood lumber and plywood, and a major consumer of many other timber products such as hardwood plywood, particleboard, and insulation board. And not only is it a large direct consumer of wood, but it provides the stimulus for homeowner purchase of many manufactured goods, including household furniture. Furniture production, of course, is a key manufacturing use of hardwood lumber, plywood and veneer, hardboard, and particleboard.

Starts of new housing units dropped sharply through the first 5 months of 1980. However, since that time housing construction has

been improving, and in September new privately owned starts rose to a seasonally adjusted annual rate of about 1.5 million units. Although this was somewhat below the 1.7 million units started in 1979, and was apparently due in part to a larger than usual increase in federally subsidized units, it represented a 70-percent rise from the low recorded in May. Single-family starts have increased at a somewhat smaller rate than multifamily, a factor important to the timber industries because average wood products use in single-family units is normally much larger than in other types of housing. Mobile home shipments and placements have also shown recent improvements.

Although housing starts have been increasing for a number of months and permits for new housing units continued to rise, most industry economists feel that high-interest rates will continue to impact housing markets in the last quarter, that starts will slow somewhat, and that total starts for the year will amount to about 1.2 million units. The forces affecting housing are expected to continue into 1981, however, the extent and duration are a matter of some conjecture by housing analysts. Most forecasts indicate some decline in interest rates next year, which is expected to trigger an increase in starts to about 1.5 million units. A somewhat larger proportion of the units is expected to be in multifamily structures than in most recent years. Mobile home shipments and placements are likely to follow similar trends.

Expenditures for residential upkeep and improvements declined on a seasonally adjusted basis in the second quarter of 1980. Although data not yet available, it is likely that this trend has been reversed, and that expenditures will be up in 1981 if the economy moves as discussed earlier.

Nonresidential construction activity is also down in 1980. Preliminary data indicate the seasonably adjusted annual rate of expenditures (measured in 1972 dollars) in August was almost 10 percent below the total for 1979. Expenditures for private nonresidential buildings, the most important wood-using segment of nonresidential construction, was down about 7 percent from 1979.

The outlook for the coming months is mixed. The seasonally adjusted index of contracts for future nonresidential construction was showing a downward trend in midyear. In contrast, business plans for new plant and equipment expenditures indicate increases for the last half of 1980. However, on balance, new nonresidential construction expenditures seem likely to show little growth in the latter part of 1980 and to move up slowly in 1981.

The seasonally adjusted index of industrial output—an important indicator of the demand for pallet lumber, container board, and some grades of paper—dropped through the first 7 months of 1980 before showing small gains in August and September. The rise in September increased the index to 142.7 (1967=100), still some 6.7 percent below September 1979. Container production, a large market for paperboard, hardboard, veneer, and some grades of lumber, was following the same trend. The index of output for the furniture and fixtures industry—a major end-user of hardwood lumber, plywood, veneer, particleboard, and hardboard—was 3 percent below 1979 after the first 7 months of

the year. Recent increases in new factory orders, coupled with expected trends in the economy discussed earlier, indicate the likelihood of continued though somewhat slow growth in industrial output in the months ahead and in 1981.

INTERNATIONAL MARKETS

The United States is the world's leading importer of timber products—chiefly lumber, woodpulp, and paper and board from Canada and veneer and plywood from Southeast Asia. The total value of these imports in 1979 was about \$9.2 billion or about 4.4 percent of the value of all U.S. imports. In terms of roundwood equivalent, about a fifth of our apparent consumption of timber products has been imported in most recent years.

The United States is also a major timber products exporter. In 1979, the total value of timber product exports was about \$6.9 billion—some 3.8 percent of our exports. Although we ship a variety of wood products to many countries, our principal export markets are Japan for softwood logs and lumber, pulp chips, woodpulp, and paper and board products, and Western Europe for woodpulp, paper and board products, and smaller amounts of lumber and plywood.

International demand for many U.S. timber products, which had been rising since economic conditions in our major overseas markets began to improve several years ago, continued up in early 1980. However, by midyear, measures to reduce inflation, trade deficits, and public expenditures in many Western European countries had led to a slowing in their economies. Likewise, Japanese economic activity including housing, the principal market for most of the logs and lumber imported from the United States, has been slowing. International economists expect these conditions to continue during the remainder of 1980 and early 1981.

TIMBER PRODUCTS PRODUCTION, TRADE, AND CONSUMPTION

Softwood lumber

Primarily in response to the weakness in the major construction markets, particularly new housing, softwood lumber production was sharply down in the first 7 months of 1980. For example, data published by the National Forest Products Association show that output through July was about 19 percent below production in the similar period in 1979. Current expectations about housing and other markets indicate that production will likely show some increase in the last quarter. Consequently, production for the year is estimated at about 24.6 billion board feet, some 18 percent under the 30.1 billion board feet produced in 1979 (table 1).

Data from the first 7 months of the year indicate that softwood lumber imports are likely to decline to about 9.1 billion board feet, also down 18 percent from 1979 and 24 percent under the record 11.9 billion board feet imported in 1978. As has been true in recent years, nearly all of this will come from Canada.

TABLE 1.—WOOD PRODUCTS PRODUCTION, CONSUMPTION, AND TRADE (1977, 1978, AND 1979 ACTUAL, 1980 PROJECTIONS)

Product and year	Domestic production	Imports	Exports	Apparent consumption
Softwood lumber (billion board feet):				
1977	31.2	10.4	1.4	40.2
1978	31.3	11.9	1.4	41.8
1979	30.1	11.2	1.8	39.5
1980	24.6	9.1	2.2	31.5
Hardwood lumber (billion board feet):				
1977	6.7	.3	.2	6.8
1978	7.0	.4	.4	7.0
1979	7.6	.4	.4	7.6
1980	7.2	.3	.5	7.0
Softwood plywood (billion square feet, $\frac{3}{8}$ -in basis):				
1977	18.9	(¹)	.3	18.6
1978	19.5	.1	.3	19.3
1979	19.4	(¹)	.4	19.0
1980	16.5	(¹)	.5	16.0
Hardwood plywood (billion square feet, $\frac{3}{8}$ -in basis):				
1977	1.2	2.3	.1	3.4
1978	1.2	2.5	(¹)	3.7
1979	1.1	2.1	(¹)	3.2
1980	.9	1.1	(¹)	2.0
Particleboard ² (billion square feet, $\frac{3}{4}$ -in basis):				
1977	4.0	.2	.1	4.1
1978	4.4	.2	.1	4.5
1979	4.1	.2	.1	4.2
1980	3.7	.3	.1	3.9
Hardboard (million tons):				
1977	2.2	.2	.1	2.3
1978	2.3	.3	(³)	2.6
1979	2.1	.3	(³)	2.4
1980	1.7	.2	(³)	1.9
Insulation board (million tons):				
1977	1.4	(³)	(³)	1.4
1978	1.4	.1	(³)	1.5
1979	1.4	.1	(³)	1.5
1980	1.1	(³)	(³)	1.1
Pulpwood (million cords):				
1977	79.8	1.3	3.4	77.7
1978	80.1	1.7	3.1	78.7
1979	84.2	1.4	3.8	81.8
1980	89.9	1.7	4.0	87.6

¹ Less than 50,000,000.² Includes medium density fiberboard.³ Less than 50,000.

Note: The projections presented for 1980 are based on the trends in the major markets discussed in this paper and should not be viewed as forecasts of actual volumes. Data presented are subject to rounding.

In response to increased demand, particularly from Japan, exports rose sharply in the first half. However, because of ample inventories and lower demand in the major overseas markets, exports are expected to slow in the second half. As a consequence, total exports for the year are estimated at 2.2 billion board feet, still some 22 percent above the volume exported in 1979.

Based on the estimates of production, imports, and exports discussed above, apparent consumption (that is, production plus imports minus exports), in 1980 is estimated at 31.5 billion board feet—about 20 percent below 1979. Much of this decline is attributable to decreased use in residential construction. If housing construction improves as outlined above, and the other major markets perform as discussed earlier, consumption is likely to increase in 1981. Production, imports, and exports are also expected to rise.

In response to declining demand, softwood lumber prices dropped sharply through the first 5 months of the year. Although prices have

been moving up, if somewhat erratically, since that time, they have failed to reach year-earlier levels. For example, the producer price index for all softwood lumber was 347.5 (1967=100) in September 1980, about 14 percent below the high of 405.6 reached in September 1979 (table 2). Some continued growth in the prices for most items is likely late in the year and in 1981 as demand moves up.

TABLE 2.—PRODUCER PRICE INDEXES FOR SELECTED WOOD PRODUCTS

[1967=100]

Product	1978 annual	1979 annual	September	
			1979	1980
Softwood lumber	346.0	380.0	405.6	347.5
Hardwood lumber	235.8	260.0	260.7	247.8
Softwood plywood	326.4	322.3	330.7	328.9
Hardwood plywood	140.2	169.1	173.8	176.3
Particleboard ¹	151.2	139.6	138.0	159.4
Hardboard ²	157.0	164.7	170.8	191.5
Insulation board	202.5	198.8	187.4	215.1

¹ Corestock.² Type II, 1/8-in.

Source: U.S. Dept. Labor, Bureau of Labor Statistics.

Hardwood lumber

Although there have been month-to-month fluctuations, production of hardwood lumber has held up fairly well in 1980 despite somewhat lower demand in many of its major markets. National Forest Products Association data indicate output through the first 7 months of the year was 2.7 percent above the January–July period in 1979. However, both orders and shipments were below year-earlier levels. As a consequence, mill inventories were over 72 percent higher than in July 1979. Some adjustment in these factors is probable in the last quarter. Consequently, production for the year is estimated at about 7.2 billion board feet, 5 percent under 1979.

Hardwood lumber imports in the first half of 1980 were also somewhat below those in the first half of 1979, and very little strengthening is expected in the last half. The total for the year is thus estimated at 0.3 billion board feet, about 0.1 billion under 1979. In contrast to imports, first half data on exports show exports up by over 30 percent. Because of conditions in the major foreign markets, some slowing is probable in the last half. However, the year's total is expected to be near 0.5 billion board feet, about 25 percent above shipments in 1979.

Apparent consumption of hardwood lumber in 1980, based on the estimates of production and trade given above, should amount to about 7 billion board feet, 8 percent below 1979. Actual consumption will be somewhat smaller because of inventory building, as discussed above. Anticipated growth in the important hardwood markets indicate the likelihood of some rise in consumption and imports in 1981. Production will depend on the extent to which the large inventories are used to meet the increase.

Hardwood lumber prices, as measured by the producer price index, have been dropping in 1980 in response to reduced demand. Prices in

September (index value 247.8, 1967=100) were about 5 percent below those in January. A return to somewhat higher prices can be expected as demand picks up.

Softwood plywood

According to data published by the American Plywood Association, total production of softwood plywood in the first 8 months of 1980 was 10.7 billion square feet ($\frac{3}{8}$ -inch basis). This is a fifth under production in the comparable period in 1979. Based on the likelihood of some improvement in the major markets in the last months of the year, softwood plywood production for 1980 is estimated at 16.5 billion square feet, about 15 percent below output in 1979.

Softwood plywood exports, which had been slowly rising in the 1970's, continued up in 1980 and are expected to total near 0.5 billion square feet, about 25 percent above the volume in 1979. Imports will remain relatively insignificant.

Apparent consumption in 1980 is therefore estimated at 16 billion square feet, 16 percent below 1979. The drop in 1980 was due primarily to the decline in residential and other construction markets and to some extent to the substitution of other types of structural panels for plywood in some uses. The projected rise in housing construction in 1981 should result in increases in use of most types of panels.

The producer price index indicates that softwood plywood prices have fluctuated in 1980, but in contrast to softwood lumber are somewhat above those early in the year. Despite this increase, the index for September—328.9 (1967=100)—was below September 1979 and only 2 percent above the average for 1979. Some increase is probable if demand rises in the weeks ahead and in 1981, as discussed above.

Hardwood plywood

Hardwood plywood production has dropped sharply in 1980 in response to the declines in the production of housing and furniture and other manufactured goods. Production in 1980 is expected to total about 0.9 billion square feet ($\frac{3}{8}$ -inch basis), 18 percent below 1979.

Data through July indicate that imports are likely to total about 1.1 billion square feet in 1979, down some 48 percent from 1979. Exports are expected to remain relatively insignificant.

Given these trends in production and trade, apparent consumption of hardwood plywood in 1980 is estimated at 2 billion square feet, 38 percent under 1979. Some increase in consumption is probable in 1981 if the various hardwood markets follow the trends discussed earlier. As in most recent years, about three-fifths of total consumption will likely be supplied from imports.

Like softwood plywood, hardwood plywood prices have risen in the first 9 months of this year; however, the increase has been much smaller. In September the producer price index was 176.3 (1967=100), less than 1 percent above the average in January. Some additional rise in prices can be expected late in 1980 and in 1981 if the major markets improve.

Particleboard

Particleboard production (including medium density fiberboard) in 1980 is expected to be down about 10 percent to 3.7 billion square

feet ($\frac{3}{4}$ -inch basis). Data for the first half of the year suggest that imports are likely to be about 0.3 billion square feet and that exports will be about 0.1 billion. Consumption is thus estimated at 3.9 billion square feet, about 7 percent below 1979 use. These declines are primarily a reflection of the situation in housing—the market for large volumes of particleboard used for underlayment under carpeting and for subflooring in mobile homes. The expected improvement in housing construction in 1981 should cause some increase in that end-use sector. However, growth in other sectors, particularly manufacturing, should also contribute to rising production and consumption.

Hardboard and insulation board

Hardboard production in 1980 is estimated at about 1.7 million tons (about 5.2 billion square feet, $\frac{1}{8}$ -inch basis), 20 percent below production in 1979. Imports are expected to drop about 0.1 billion tons to 0.2 billion tons. Exports will likely remain small. Consumption with these estimates of production and trade would amount to 1.9 million tons (approximately 5.8 billion square feet), down about 21 percent.

Data for the first half of 1980 indicate that insulation board production for the year will total about 1.1 million tons (2.7 billion square feet, $\frac{1}{2}$ -inch basis)—nearly a third less than in 1979. Imports and exports are expected to be under 0.1 million tons. Therefore, consumption is also estimated at 1.1 million tons, 27 percent under use in 1979.

If housing and manufacturing output follow the trends outlined earlier, the demand for hardboard and insulation board are expected to rise in 1981.

Pulpwood

According to data from the American Pulpwood Association, pulpwood receipts at U.S. mills during the first 8 months of 1980 was some 7.2 percent above receipts in January–August 1979. Most of this, however, was used to build inventories. The American Paper Institute, reported production of paper and paperboards in the first 8 months of 1980 at an annual rate of about 63.9 million tons, very near output in 1979. Production of woodpulp—which currently constitutes about 77 percent of the raw materials consumed in U.S. paper and board mills—was also close to the 50.2 million tons produced in 1979. Industry data indicate that paper and board production, and thus woodpulp production, are likely to continue up at relatively slow rates for the remainder of the year. Consequently, pulpwood production (roundwood and chips) for 1980 is estimated at 89.9 million cords, 6.8 percent above 1979. End-of-year inventories are expected to remain well above those at the end of 1979. Pulpwood production in 1981 will depend not only on pulp production but also on how rapidly inventories are reduced.

Imports of pulpwood are expected to total about 1.7 million cords and exports approximately 4 million. These volumes are, respectively, about 20 percent and 6 percent above 1979. Nearly all of the increases in imports and exports are likely to be in the form of chips.

Apparent pulpwood consumption in 1980, given the above estimates of production and trade, amounts to 87.6 million cords, above 7 per-

cent more than in 1979. Actual consumption will be much lower. Prospective trends in economic activity and in manufacturing suggest that the slowly rising trends in pulpwood consumption will continue in 1981.

Softwood log trade

Softwood log exports, nearly all to Japan, during the first 8 months of 1980 were below the record levels attained in the same period in 1979. Further, the latest reports from Japan indicate that inventories are excessive and prices falling. Exports for the year have, therefore, been estimated at 3.3 billion board feet, 12 percent under shipments in 1979. The outlook for 1981 is for some further decline. Imports of softwood logs have not changed much and are expected to total about 0.2 billion board feet in 1980.

Hardwood log trade

Hardwood log exports for 1980 are estimated at 0.2 billion board feet. Although the volume is small, most of the hardwood log exports in 1980, and in recent years, have been composed of walnut and other preferred species that are in short supply in the United States. These exports have thus been an important contributing factor to the large increase in stumpage and log prices for some domestic species. Hardwood log imports in 1980 are expected to be close to the 1979 volume of 15 million board feet.

SUMMARY

Given the trends in consumption, trade, and production for the various products discussed earlier, U.S. production of all roundwood products, including an estimated increase in fuelwood output, is expected to drop to about 11.6 billion cubic feet in 1980. At this level, output would be about 10 percent below 1979.

Total imports, including the pulpwood equivalent of pulp, paper, and board, are likely to drop to about 3.6 billion cubic feet, 2 percent below 1979. Exports, on the other, are expected to rise about 3 percent.

With these volumes of production and trade, total apparent consumption of industrial roundwood will be 13 billion cubic feet, down about 12 percent from consumption in 1979. Some rise in consumption, imports, and production can be expected in 1981 if the various markets, particularly housing, behave as discussed earlier. Exports will likely show relatively little change.

AGRICULTURAL INPUTS AND FINANCE

THE OUTLOOK FOR FARM MACHINERY, PESTICIDES, AND FERTILIZERS*

(By Robert D. Reinsel, Economics and Statistics Service, U.S. Department of Agriculture)

The situation and outlook for fertilizer, pesticides, and farm machinery is determined in part by current and expected farm commodity prices and farm income, variations in weather, the cost and availability of raw material for manufacturing, and international supply and demand adjustments.

Last year at this conference I forecast a strong and possibly record season for fertilizer, farm equipment, and pesticides for 1980 based on an expectation that farm commodity prices would remain strong and that input price increases, particularly fertilizer price increases, would be moderate.

During the 6 months following the conference, unforeseen events, altered the situation from the outlook. In the next few minutes I will again suggest how the situation is expected to shape up for 1981. To do that, I will make the following assumptions.

First, earthquakes, volcanic eruptions, shipping accidents, strikes, and regional wars will be kind enough to avoid manufacturing and shipping facilities for these inputs. Second, farm commodity prices and commodity/input price ratios will be higher in 1981 than in 1980. Third, no major disruption in energy supplies will occur. Fourth, interest rates during the spring purchasing season will be below current levels. And, fifth, world fertilizer markets will be somewhat tight.

Having thus qualified the forecast, I will turn to the situation and outlook for the specific inputs beginning with farm machinery.

FARM MACHINERY

In the first 8 months of 1980, farm equipment sales experienced a significant decline as a result of tight credit, lower farm income, higher energy prices, and higher farm machinery prices. Sales of two- and four-wheel drive tractors dropped 20 and 13 percent, respectively. Combine sales were off 19 percent and baler sales declined 26 percent.

The increase in farm equipment prices in the face of declining sales resulted primarily from higher manufacturing costs. For example, in the past 9 months, semifinished steel prices increased 8 percent, foundry and forge prices 6 percent, electric power 18 percent, and tires and tubes 8 percent.

*Material for this speech was prepared by Paul Andrilunas, Ted Eichers, Richard Rortvedt, and Carl Vosloh, agricultural economists, Inputs and Finance Branch, NED, ESS.

The slow market for farm machinery could have been much worse if farm commodity prices and thus income prospects had not risen sharply in the third quarter of 1980.

The outlook for 1981 is that farm equipment sales will increase rather sharply, perhaps reaching 1979 levels, despite a 12 to 14 percent increase in prices.

Farm income is rising and is expected to continue rising in 1981. Farmers who experienced good crop production and favorable prices in 1980 will be in the market for equipment and although interest rates are currently rising, they are expected to remain below 1980 levels in 1981. In addition, farm equipment manufacturers and dealers have been offering a number of sales promotion incentives, including; a waiver of interest until March 1981, rebates on new equipment, and issuance of script that can be used for parts and services.

However, if interest rates do not moderate, the recovery of the farm equipment industry will be delayed substantially.

PESTICIDES

Farm insecticide purchases in 1980 were down for the second consecutive year because of low insect populations and drought related crop conditions in much of the South. Also, some corn growers in the Corn Belt cut back on insurance use of soil insecticides. Herbicide sales were up slightly as farmers, spurred by increasing fuels costs, continue to replace mechanical cultivation with chemicals. Currently 85 to 90 percent of the corn, cotton, soybean, and tobacco acreage is treated with herbicides at an average rate of 2 pounds or more per acre.

Supplies of all pesticide materials were ample last year with more than adequate supplies of insecticides in most areas, especially in the Cotton Belt. As a result of the cutback in use, insecticide inventories are unusually high with some producers and dealers reporting carry-over stocks at twice their normal levels. Also, synthetic pyrethroid insecticides, registered on an expedited basis since 1977 for controlling cotton bollworms and budworms, continue to make inroads into the markets for traditional chemicals such as toxaphene, methyl parathion, and EPN.

The Environmental Protection Agency estimated the world pesticide market to be nearly \$10 billion in 1980 at the basic producer level with the United States accounting for about one-third of the world total. At the user level, EPA estimated total U.S. sales at \$5.8 billion with agriculture accounting for 62 percent of the total. EPA has estimated total U.S. pesticide consumption in 1980 at 1.2 billion pounds of active ingredients with agriculture's share at 72 percent.

Regulatory actions continue to play an important role in farm pesticide use, with 30 to 40 percent of the insecticides and over half of the fungicides being reviewed in the pesticide reregistration process. Implementation of Integrated Pest Management programs is gradually reducing the need for certain types of pesticides, especially insecticides, and could mean substantial reductions in the use of these materials in the future. A study by the Office of Technology Assessment reported that Integrated Pest Management could reduce pesti-

cide use up to 75 percent for some crops, and reduce preharvest pest-caused losses by 50 percent.

Exports continue to take 25 to 30 percent of U.S. pesticide production, and are likely to take an increasing share as domestic demand growth slows and an increasing rate of growth appears in other countries, especially in the developing nations.

Supplies of all types of pesticides should again be adequate in 1981. With insecticide carryover stocks equal to about a third of last year's production, manufacturers are cutting output to 60 to 65 percent of available capacity. Still, overall supplies of major pesticides are expected to be greater than last year because of the large inventory carried over from 1980. Herbicide inventory carryovers into the 1980 year were also substantial, at about 30 percent of last year's production. However, herbicide production facilities are scheduled to be operating at 85 percent capacity for the coming season.

Manufacturers anticipate no particular problem in producing pesticides for the 1981 season. However, since most pesticides are petroleum based, a major disruption in petroleum supplies could create some difficulties.

During the 1970's, pesticide prices increased at just about half the rate of other production items. As a result, pesticides currently account for a smaller share of farmers' total crop production costs than in the early 1970's. Farm pesticide prices last season were generally 5 to 15 percent higher than the year before. However, the price of atrazine continued a 4-year decline, with a 6-percent drop, while the price of 2,4-D jumped 50 percent.

Similar price increases are expected for 1981 with manufacturers' prices to distributors up an average of 10 percent over 1980 for both herbicides and insecticides. These increases are likely to be passed on to the grower as distributor margins are minimal.

FERTILIZERS

The fertilizer year, which ended June 30, 1980, began with a strong fall season in 1979. Expectations of price increases were in line with the general rate of inflation and 1980 farm income was expected to be relatively favorable.

Several events conspired to change that outlook. First, the International Trade Commission in response to a petition of several members of the industry recommended an import quota on nitrogen, the U.S.S.R invaded Afghanistan, grain sales to U.S.S.R. were reduced, and the longshoremen refused to offload Russian ammonia. At the same time, President Carter imposed a temporary quota on ammonia imports and asked for a review of phosphate exports to the U.S.S.R. and a review of the desirability of an import quota on nitrogen fertilizer. These actions resulted in no quota being imposed on ammonia imports and the stopping of exports of superphosphoric acid and other phosphates to the U.S.S.R.

In contrast to what had been expected in November 1979, phosphate and nitrogen fertilizer prices rose rapidly and farm income prospects were at the lowest level in several years by mid-March 1980. At the beginning of the planting season fertilizer/corn price ratios were ex-

tremely unfavorable. Relative prices for phosphates had increased 42 percent, ammonia 24 percent, and potash 16 percent compared with a year earlier.

As a result of the sharp fertilizer price increases, the unfavorable prices for certain farm commodities and tight credit, fertilizer application rates were reduced. Phosphate and potash application rates were trimmed because of the carryover of these nutrients in the soil. Thus, despite increased crop acreage consumption of phosphate (P_2O_5) declined 4 percent from 5.6 to 5.4 million tons. Use of potash (K_2O) dropped 1 percent to 6.16 million tons.

Because reductions in nitrogen fertilizer application rates can have a substantial impact on crop yields, nitrogen application rates were not trimmed and total nitrogen consumption was up 6 percent above 1978-79 consumption, reaching a record 11.4 million tons.

CONSUMPTION 1980-81

Rising farm income and continued strong export demand for crops dominate the outlook for domestic fertilizer use in 1980-81. Improved economic conditions in the farming sector will undoubtedly translate into increased fertilizer consumption and total domestic fertilizer use may reach record levels in 1980-81. More planted acres—primarily corn—will increase nitrogen use above 1979-80 levels by 2 to 4 percent. Potash use will likely reach record levels of 6.4 million tons. Use of P_2O_5 is expected to match the record level achieved in 1976-77. Total nutrient consumption will likely reach 24 million tons.

Although the outlook for increased fertilizer use in 1980-81 appears favorable, larger than expected increases in farm production costs, especially fertilizer, or less than expected improvement in farm commodity prices could dampen the expected increase in fertilizer application rates or reduce expected increases in planted acres.

Early fall movement of fertilizer from manufacturers in 1980-81 is well below year earlier levels. Dry soil conditions reduced or delayed fertilizer applications in wheat areas. Below average moisture conditions in the Southeast and other more localized areas appear to have reduced fertilizer use or delayed normally expected fall application. However, dealer inventories were quite heavy at the close of the 1979-80 season and farm applications may have been heavier than would be implied by manufacturer shipment data. In addition, domestic summer movement of fertilizer has been slower than usual with exports accounting for much of the movement, especially for phosphates.

PRICES

The wholesale prices of nitrogen and phosphate fertilizers have fallen from peak levels reached in March 1980. At present, farm prices for some fertilizer materials are below May 1980 levels and appear likely to remain below those levels for the remainder of 1980. However, by early 1981 supply adjustments can be expected which will strengthen prices.

Fertilizer prices paid by farmers could average 8 to 12 percent higher in spring 1981 compared with a year earlier. Improved domestic demand plus a brisk world demand for fertilizer materials

would allow the fertilizer industry to pass through rising fertilizer production, transportation, and retailing costs.

Nitrogen could exhibit the largest fall 1980 to spring 1981 price rise. May 1981 prices could average 10 to 15 percent above a year earlier. Prices for ammonia and urea will be up the most. More modest price rises are expected for nitrogen solutions and other nitrogenous fertilizer materials.

Phosphate prices could decline during fall 1980 because of an above average carryover in the distribution system. Prices in early 1981 will probably advance, 5 to 10 percent, above year-earlier levels as domestic planting activity increases in the spring season. However, the export trade will have to maintain a vigorous pace throughout 1980-81 to support this increase.

Fall 1980 potash prices are higher than a year ago and additional farm price increases are expected with spring 1981 prices averaging 10 to 12 percent above year-earlier levels.

TABLE 1.—FERTILIZER/CORN PRICE RATIOS, 1978-81

[Bushels to buy 1 ton]

Fertilizer material	1978	1979	1980	1981
Ammonia (NH_3)	82.3	77.0	99.1	79.1
Triple superphosphate (TSP)	70.2	74.9	106.9	94.0
Diammonium phosphate (DAP)	86.5	89.6	128.6	100.5
Potash	44.8	49.8	58.4	46.5

SUPPLIES

Supplies of fertilizer materials will be adequate to plentiful. The domestic fertilizer industry is coming off a year of high production and less than expected use of phosphate and potash. Because of the decline in consumption in 1979-80, stocks at various locations throughout the distribution system are above year earlier levels. These carry-over stocks plus readily obtainable production from existing capacity could easily supply the expected increase in domestic use in 1981. However, as in other years, a tight supply situation could develop because of unexpected shortfalls in world production. Shortfalls in world production could enhance the need for exports from the United States and possibly change the domestic supply situation from comfortably adequate or plentiful to a tight supply situation.

Should last year's levels of phosphate fertilizer production continue well into the current fertilizer year, production will outstrip demand at projected levels of use. Domestic phosphate producers may need to reduce production to keep inventories at acceptable levels. The magnitude of any cutback in phosphate fertilizer production will be influenced heavily by the level of phosphate fertilizer exports.

WORLD FERTILIZER SITUATION

World fertilizer consumption during 1980-81 is expected to increase about 5 percent to almost 117 million metric tons of nutrients. Existing nitrogen and phosphate production facilities are ample for satisfying this anticipated strong level of demand. Potash supply ca-

pability is expected to be somewhat tighter, so increased operating rates in developed country mines and inventory drawdown can be foreseen. Despite the potential for relatively comfortable world supply/demand balance for nitrogen and phosphates, current world events may exert upward pressure upon world fertilizer prices.

The war between Iran and Iraq has the direct impact of reducing ammonia, urea, and sulfur supplies as well as the indirect effect upon world energy prices, thus potentially raising feedstock costs. The combined ammonia and urea capacities of Iran and Iraq are 1.1 and 1.10 million metric tons, respectively, accounting for a very small share of world productive capacity. Thus the loss of nitrogen fertilizer production from these countries should have minimal impact upon world nitrogen prices. But, if the war causes major disruptions in world energy supplies, nitrogen fertilizer feedstock costs will increase in concert with overall energy prices. This is the greatest uncertainty currently affecting the world nitrogen situation.

The war may also affect phosphate production costs due to the termination of Iran's and Iraq's sulfur exports. Sulfur is used to process phosphate rock into fertilizer. Together the two countries export about 1 million metric tons of sulfur per year—about 6 percent of world trade. Sulfur has been in tight supply for the past couple of years so prolonged curtailment of Iranian and Iraqi exports could send sulfur prices higher. Thus far the impact has been mostly concentrated in Asia. India had been heavily dependent upon Iraqi sulfur and was recently forced into the spot market to replace lost supplies.

Poland is an important net exporter of sulfur and recent labor disruption there cause a small decline in sulfur shipments. If the recent labor settlement there fails, or if natural gas is curtailed, still more uncertainty would cloud the world sulfur outlook.

India figures prominently in the world fertilizer trade picture again this year. Attempting to rebuild food stocks following the 1979 drought, Indian agriculture is expected to significantly increase its demand for fertilizer in 1980-81. However, the country is still plagued by petroleum-based feedstock supply problems because of the cutoff of Iranian and Iraqi crude oil supplies and political and labor unrest in the oil producing and refining region of northeast India. India has increased imports of urea and diammonium phosphate, for example, and will soon purchase another \$66 million worth of these products with USAID financing.

Urea markets may also be under pressure from unexpected purchases by Mexico and Indonesia. Both nations were expected to export urea this year, but growing domestic demand and production difficulties have thrust them into the world market.

Events involving Brazil and the Soviet Union could affect phosphate markets. Early in 1980, Brazil greatly increased phosphate imports but farmer demand has recently become sluggish and inventories are building. Brazil has postponed or canceled several phosphate purchases in the past few weeks. The U.S. embargo on phosphate exports to the U.S.S.R. is expected to remain in effect as long as U.S. grain shipments to that country remain restricted. If Brazilian demand resurges or if the U.S. phosphate export ban to the Soviet Union is lifted, demand for U.S. phosphate exports could surge and exert upward pressure on domestic phosphate prices.

Small potash supply capability deficits are forecast through 1981-82. Supply and demand should be about balanced in 1982-83 and a more comfortable supply capability surplus could occur in 1983-84 when major Canadian expansions come onstream. This forecast is more pessimistic than in previous years due, primarily, to the poor Soviet potash production and export performance in 1979. Soviet reliability as a potash exporter is now seriously questioned.

Actual, physical shortages of potash are not likely to occur since the forecast deficits are quite small—2-3 percent of consumption. Stock reductions and small improvements in operating rates at facilities in the developed market economies are likely to be able to satisfy most of the expected demand for potash.

In summary, prices for pesticides, machinery, and fertilizer are expected to rise and supplies are expected to be readily available. However, the potential for market disruption exists and the risk of a tight market for some fertilizer materials appears to be high.

CROP PRODUCTION COSTS SITUATION AND OUTLOOK

(By Robert E. Olson, Economics and Statistics Service,
U.S. Department of Agriculture)

USDA conducts a comprehensive program of research on costs of production in compliance with the provisions of Public Law 93-86, the Agriculture and Consumer Protection Act of 1973. Annual reports are submitted to the Congress on costs of producing selected crops, milk, feeder cattle, fed cattle, hogs, and sheep.

National average crop production costs are based on methods that provide total cost accounting for crop production on an average acre of land. Data are obtained from several sources. The main sources are surveys which provide information on cropping practices, input costs and use, and machinery complements. A survey of 5,460 major crop producers was conducted in March and April 1979 for the 1978 crop. The first comprehensive cost of production survey of rice producers was conducted in the fall of 1979 for the 1979 crop.

Costs of inputs are updated on the basis of current USDA estimates and projections of prices paid by farmers for inputs, changes in real estate values, and interest rates. The Firm Enterprise Data System—FEDS—is used to process and evaluate the data and develop the annual estimates. FEDS is a series of computerized budgets developed for each of the crops by major producing region and for the United States.¹

The estimates of production costs for years through 1980 presented here were developed through the FEDS. The projections for 1981 are based on input price assumptions developed by ESS analysts in the context of the macroeconomic outlook. Yield assumptions for 1981 were derived for each crop from multiple regression analyses of historical relationships between per-acre yields and time, weather, and area harvested.

Since national averages hide variations from the mean, the absolute levels of cost may not apply for a given farmer, State, or region. Costs vary significantly from farm to farm and across States and regions. This variability among farms is attributable to such factors as climate, soil types, and the varying managerial skills of producers. The size of the farm is also an important factor, as some operators achieve cost reductions through using machinery more efficiently, realizing quantity discounts, and securing advantageous marketing arrangements.

¹ FEDS is under the direction of Ronald D. Krenz, National Economics Division, stationed at Department of Agricultural Economics, Oklahoma State University, Stillwater, Okla. 74074.

The national average estimates show year-to-year changes in production costs. They are indicative of longer run returns to resources but are not adequate indicators for assessing total farm income or farmers' current cash situation.

1980 INPUT PRICES RISE

Prices of principal inputs in crop production rose 6 to 39 percent in 1980. Fuel, motor supplies, fertilizer, and interest rates led the 1980 cost increases. The prices of diesel fuel and gasoline, important in crop production, rose more than the other components of the index of prices paid for fuels and energy. Fertilizer prices averaged 23 percent higher and agricultural chemicals were up 18 percent. Farm motor supplies increased 17 percent. Both long-term and short-term interest rates were sharply higher this year. Interest rates significantly affect estimates and projections of variable costs, machinery costs, and land charges.

TABLE 1.—INPUT PRICE INCREASES, 1980 AND PROJECTED 1981

[In percent]

Item	Increase	
	1979-80	1980-81
Fuels and energy.....	39	20 to 25.
Farm motor supplies.....	17	20 to 25.
Fertilizer.....	23	12 to 14.
Tractors and self-propelled machinery.....	12	10 to 13.
Consumer Price Index.....	13	10 to 13.
Agricultural chemicals.....	18	11 to 13.
Other machinery.....	11	9 to 11.
Wage rates.....	8	10 to 12.
Autos and trucks.....	6	12 to 14.
Building and fencing.....	8	11 to 13.
Seed.....	8	9 to 11.
Farm real estate values.....	9	11 to 15.
Short-term interest rates.....	20	-10 to -20.
Long-term interest rates.....	12	-10 to -15.

The input prices such as fuel, fertilizer, and chemicals which contributed heavily to the large increases in production costs in 1980 are not expected to increase as much in 1981. For example, all fuels and energy may increase 20 to 25 percent compared with 39 percent in 1980. Decontrol may add 10 cents a gallon to gasoline prices next year and higher prices are likely for imported crude despite conservation efforts. Fertilizer and chemicals will be heavily influenced by energy prices, but will likely move up at a slower rate. Following interest rates in the general economy, interest rates to farmers for production and real estate loans may decline in 1981.

PER ACRE COSTS UP SHARPLY IN 1980

Per acre production costs have increased substantially for all crops since 1978. For example, corn production costs, excluding land, increased from \$149.38 per planted acre in 1978 to \$213.46 in 1980—table 2. Costs, excluding land, include variable costs, such as seed, fertilizer, and fuel; machinery ownership costs; general farm overhead; and management.

Total costs for growing an acre of corn, including land, increased from \$198.35 in 1978 to \$278.11 in 1980. The land charge is calculated as an average of cash rent, share rent, and a charge for owner-operator land. The latter include taxes and interest charges based on current Federal land bank interest rates applied to acquisition value of land—35-year average.

In 1980, per acre production costs—excluding land—increased 21 percent over 1979 for corn, 21 percent for soybeans, 19 percent for wheat, and 14 percent for cotton. The average increase for 10 crops was 20 percent.

Per acre cost increases varied from 14 to 26 percent among 10 crops in 1980 partly because of the different impacts on each crop of large increases in fuel prices and interest rates. The increase in rice production costs was at the high end of the range because of the greater importance of input costs closely related to energy prices. The per acre cost increases for cotton were low in 1980 because the large decline in per acre yields from 1979 levels reduced ginning costs substantially. When ginning costs were excluded, the increases for cotton compared more closely with the other crops.

TABLE 2.—PER-ACRE COSTS OF PRODUCTION, 1978-80

[Dollars per planted acre]

Crop	Total, excluding land			Total, including land ¹		
	1978	1979	1980	1978	1979	1980
Wheat.....	74.30	88.89	105.72	98.46	119.74	138.35
Corn.....	149.38	176.54	213.46	198.35	234.51	278.11
Sorghum.....	96.69	119.16	141.59	120.61	148.11	168.94
Barley.....	92.30	112.34	130.31	118.65	140.75	163.03
Oats.....	72.90	84.96	102.87	95.79	111.71	134.85
Soybeans.....	99.13	114.40	138.41	150.23	169.01	194.64
Flaxseed.....	57.19	68.44	82.76	73.23	86.43	102.04
Cotton.....	260.11	314.79	357.80	298.01	359.17	405.56
Peanuts.....	376.51	424.53	525.41	470.32	525.09	629.29
Rice.....	277.61	311.56	391.07	336.28	386.25	466.59

¹ Includes land at average of share rent, cash rent, and a charge for owner-operated land based on acquisition value. Acquisition value is assumed to be the average of the last 35 yrs.

The detailed cost data for corn—table 3—show how large price increases from 1978 to 1980 for fuel, fertilizer, chemicals, machinery, and interest have increased nonland costs of production. The result was that fertilizer, machinery ownership, and fuel and lubrication, three of the five most important components of nonland costs, excluding labor and management, increased more than the totals from 1978 to 1979 and from 1979 to 1980.

TABLE 3.—COSTS FOR PRODUCING CORN, 1978-80

Item	1978 cost	1979 ¹		1980 ²	
		Cost	Percent increase	Cost	Percent increase
Nonland cost per acre:					
Fertilizer	\$33.00	\$37.53	14	\$47.95	28
Machinery ownership ³	30.83	40.40	31	49.38	22
Agricultural chemicals	13.15	13.26	1	15.76	19
Seed	11.61	12.39	7	14.25	15
Fuel and lubrication	7.62	11.76	54	17.81	60
Repairs	7.31	8.89	22	9.97	12
Farm overhead	7.18	7.94	11	8.67	9
Drying	6.12	6.34	4	6.49	2
Interest	3.13	4.24	32	6.89	27
Custom operations	4.15	4.46	7	4.51	1
Lime	1.09	1.18	8	1.40	19
Purchased irrigation water	.07	.08	—	.08	33
Labor	10.54	12.02	14	12.90	7
Management	13.58	16.05	18	19.41	21
Total	149.38	176.54	18	213.46	21
Land charge per acre:					
Composite current ⁴	86.34	107.38	24	123.43	15
Composite acquisitions ⁵	48.97	58.89	20	61.58	5
Yield per acre (bushels)	(100.5)	(109.2)	9	(90.3)	-17
Cost per bushel:					
Variable ⁶	.97	1.03	19	1.51	47
Nonland	1.49	1.62	9	2.36	46
Total, including land charge based on current value	2.35	2.60	11	3.73	43
Total, including land charge based on acquisition value	1.97	2.16	10	3.05	41

¹ Preliminary.² Projected.³ Includes replacement, interest, taxes, and insurance.⁴ Weighted average of share rent, cash rent, and charge for owner-operated land based on current value of land.⁵ Weighted average of share rent, cash rent, and charge for owner-operated land based on acquisition value of land.⁶ Includes nonland, excluding overhead, management, and machinery ownership.

PER-ACRE YIELDS FOR UNIT COST ESTIMATES AND PROJECTIONS

Per-acre yields have varied dramatically during the past two crop seasons. This variation in yields is a major source of variation in per-unit production costs. Yields in 1980 were substantially below the high yields attained in 1979 and the calculated yields for 1981.

Yields per planted acre are used for production cost calculations. Planted acre yields are lower than harvested acre yields. The yields used for the estimates presented here are adjusted to account for abandonment and for other uses such as pasture.

Projection of per-unit costs of production requires assumptions about future yields despite the fact that projections of per-acre yields are highly tenuous. The final results depend on weather, insects, disease, and other natural factors that change throughout the production period. Statistically determined yields are assumed for cost of production projections to provide an objective basis for the calculations.

Yields assumed for 1981 unit cost projections—table 4—were calculated using data for 1966 through 1980 for each of the crops except cotton and peanuts. The midpoint yields calculated for 1981 are based on multiple regressions considering the effects on yields per harvested acre of three independent variables—time, area harvested, and an index of pasture conditions as a proxy for weather. The calculated yields per harvested acre were adjusted to planted acre yields by the average relationship between harvested and planted acre yields.

TABLE 4.—YIELDS PER PLANTED ACRE, 1978-80 ACTUAL, 1981 CALCULATED

Crop	Actual			1981 calculated ¹	
	1978	1979	1980	Midpoint	Range ²
Wheat (bushels).....	29.9	31.9	29.1	31.1	29 to 33.
Corn (bushels).....	100.5	109.2	90.3	103.0	96 to 110.
Sorghum (bushels).....	53.2	59.9	42.1	53.9	49 to 59.
Barley (bushels).....	45.8	47.8	42.5	45.8	43 to 49.
Oats (bushels).....	50.1	51.3	46.0	51.3	43 to 59.
Soybeans (bushels).....	29.2	31.9	26.2	30.1	28 to 32.
Flaxseed (bushels).....	12.4	12.8	10.0	11.5	9 to 14.
Cotton (pounds).....	390	503	341	454	408 to 500.
Peanuts (pounds).....	2,602	2,586	1,634	2,569	2,250 to 2,785.
Rice (hundredweight).....	44.8	45.5	43.4	44.3	43 to 46.

¹ Based on regression of per-acre yield on time (1966-80), index of pasture conditions, and area harvested. Area harvested was omitted for cotton, and a 5-yr trend (1975-79) was used for peanuts.

² Rounded, but based on plus and minus 1 standard error of prediction. Chances are 2 out of 3 that yields will fall within this range.

A 5-year trend from 1975 through 1979, was used to calculate the peanut yields assumed for 1981. The 15-year regression was not appropriate because of a slowdown in yield increases in recent years. The 1980 peanut yield was omitted from the average because the large weight of the very low 1980 yield reduced the 1981 5-year trend yield below realistic expectations.

Area harvested was omitted as a variable from the cotton yield estimation equation because including it lowered the correlation coefficient and because of a "wrong" sign on the area coefficient. Generally, it is assumed that increasing total acreage would tend to reduce per-acre yields and this was found to be the case for other crops. For cotton, however, the area coefficient was positive, indicating per-acre yields should increase as harvested area increases. This result seems to be due to shifts of production to areas with higher yields during the period of observed data.

LOW YIELDS RAISE PER-UNIT COSTS IN 1980

Per-unit production costs, excluding land, increased from 19.5 to 65.7 percent above year-earlier levels in 1980—table 5. These large increases in per-unit costs occurred because yields were much lower than 1979 yields which further added to the large increases in per-acre costs. The largest increases were in costs directly affected by sharply higher energy prices and interest rates.

TABLE 5.—PER-UNIT COSTS OF PRODUCTION, 1978-80

Crop	Total, excluding land			Total, including land ¹		
	1978	1979	1980	1978	1979	1980
Wheat (per bushel).....	\$2.48	\$2.74	\$3.63	\$3.29	\$3.75	\$4.75
Corn (per bushel).....	1.49	1.62	2.36	1.97	2.15	3.08
Sorghum (per bushel).....	1.82	1.99	3.29	2.27	2.47	3.92
Barley (per bushel).....	2.01	2.35	3.07	2.59	2.94	3.34
Oats (per bushel).....	1.46	1.66	2.24	1.91	2.18	2.93
Soybeans (per bushel).....	3.39	3.59	5.28	5.14	5.30	7.43
Flaxseed (per bushel).....	4.61	4.25	8.28	5.91	6.75	10.21
Cotton (per pound).....	.667	.626	.915	.764	.714	1.037
Peanuts (per pound).....	.145	.164	.332	.181	.293	.385
Rice (per hundredweight).....	6.24	6.84	9.01	7.56	8.48	10.75

¹ Includes land at average of share rent, cash rent, and a charge for owner-operated land based on acquisition value. Acquisition value is assumed to be the average of the last 35 yrs.

OUTLOOK FOR 1981

The input prices such as fuel prices which contributed heavily to the large increases in production costs in 1980 are not expected to increase as much in 1981. As pointed out earlier, all fuels and energy may increase 20 to 25 percent, chemicals and fertilizer will follow, but not increase as much. Machinery prices will increase as much or more in 1981 than this year.

Nearly all input prices are expected to increase, but both long-term and short-term interest rates may decline from the 1980 average levels. This will affect estimates of production costs significantly because the interest charges on operating capital, machinery, and land are charged at current interest rates.

Per acre production cost increases may be in the range of 10 to 13 percent in 1981. This is considerably less than the increase of about 20 percent in 1980. The variation in cost increases among crops may be less in 1981 than this year because none of the projected increases in input prices are as large as those of 1980. For example, the index of prices paid for fuels and energy is projected to increase about 22 percent compared with the increase of 39 percent last year (diesel fuel and gasoline rose more than 39 percent).

Considering recent volatility in money and energy markets, it appears that the main risks of still higher cost increases are for interest rates remaining at present levels, or rising, and for fuel price increases larger than now expected.

Per unit production cost increases in 1981 will be smaller than the increases in per acre cost if yields move toward long-term trend and there are no major shocks in input markets. It is possible that per unit costs could decline if per acre yields for crops with yields substantially below trend in 1980 rise significantly. However, yield variations alone can cause considerable fluctuation in per unit production costs from year to year. For example, the standard error of prediction is 6 bushels per acre for corn. A variation of 6 bushels per acre would cause an increase or decrease of 6 percent in per bushel corn production costs.

The outcome in 1980 shows how yield and price variations can combine to produce large changes in per unit costs. There was a compounding effect on per unit production costs in 1980 from large input price increases coupled with low yields following 1979's high yields. However, with smaller per acre cost increases and higher yields in prospect, the unusually large per unit cost increases of 1980 are not likely to be repeated in 1981.

SUMMARY

In short, the outlook for crop production costs in the 1981 crop season is for:

Per acre production cost increases largely reflecting the increases in input prices. Price increases for most inputs are expected to be much smaller than in 1980, averaging close to the rate of inflation in the general economy. Per acre production costs may increase 10 to 13 percent from 1980 levels.

Smaller production cost increases on a per unit than on a per acre basis, assuming more normal crop yields. Increases in yields toward trend in 1981 would have the effect of considerably reducing per unit costs relative to per acre costs—the opposite of the situation in 1980 when higher input prices and low yields greatly increased per unit costs.

The principal factors determining production costs which could vary from the assumptions underlying the cost projections for 1981 are interest rates, per acre yields, and prices for energy and energy-sensitive inputs. These stand out because they combine considerable possibilities for variation with significant impact on production costs.

TRANSPORTATION 1981

(By John O. Gerald and Paul E. Kepler, Office of Transportation,
U.S. Department of Agriculture)

Earlier sessions of this conference have set the tone for this paper. Agricultural exports have been strong for several years, and the trend is expected to continue in 1980-81, but at a reduced rate (Fig. 1).

But we have one or two new transportation developments for you to consider. For one, the October agreement to sell 6 to 8 million metric tons (mmt) of grain annually to the People's Republic of China may result in somewhat more intensive use of port facilities on the Pacific coast than in previous years. For another, the President in mid-October signed the "Staggers Rail Act of 1980" which provides for somewhat more ratemaking freedom for the railroads. While Harold Breimyer will provide you the philosophical pros and cons of this act as well as some other recent policy developments, we must try to anticipate any impacts these developments will have on our ability to meet domestic and export needs over the year ahead.

As we explained in our Outlook paper last year, year-to-year variability in exports generates most of the variability in agriculture's total demands for transportation, so we will look at this area first. For transportation purposes, grain includes wheat, rice, feed grains, and soybeans. However, because of the sizable volume, products of soybeans are also included as "grain" in our discussion.

MOVEMENT TO EXPORT POINTS

Grains and cotton together usually make up about 90 percent of the tonnage of agricultural exports. These commodities are transportable by rail, truck, and truck-barge, and most of this tonnage competes for the same types of transport equipment. Nonetheless, some regional specialization in production along with alternative export points results in some differences in type of transport used.

TABLE 1.—U.S. AGRICULTURAL EXPORTS: VOLUME OF SELECTED COMMODITIES, 1978-79 AND 1979-80, AND PROJECTED FOR 1980-81

[In million metric tons]

Commodity	Marketing year ¹		
	1978-79	1979-80	1980-81 ²
Wheat	32.5	37.4	41.5
Feed grains	60.2	70.5	72.9
Rice	3.5	3.8	4.1
Soybeans	20.1	23.8	22.5
Soybean oil	1.1	1.2	1.1
Soybean meal	6.0	7.1	6.2
Cotton	1.4	2.0	1.3
Total	124.8	145.8	148.6

¹ Forecast.

² Projected, marketing year basis.

Source: U.S. Department of Agriculture, World Agricultural Supply and Demand Estimates, Oct. 24, 1980.

Asian markets tend to take more of our food grains while European markets take more feed grains and soybeans. European destinations account for most shipments out of Great Lakes and North Atlantic ports, and Asian destinations account for nearly all shipments out of Pacific coast ports. Wheat moves more heavily by rail to Texas ports and by rail and truck-barge to Pacific coast ports. Corn and soybeans can move by truck and rail to Great Lakes ports, rail to Atlantic, gulf and Pacific ports, and truck-barge to lower Mississippi River ports. Thus, the pressures on specific types of transport equipment may change in response to change in export destinations and the commodity mix of export sales as well as to change in the total volume of export sales.

Projected export sales of grains and cotton in 1980-81 are at a record high level, and exceed 1979-80 estimated exports by 2.8 million metric tons (table 1). This relatively small increase in total tonnage should not be particularly difficult to handle unless new patterns of movement result in relatively slower turnaround times on equipment. The commodity mix of projected sales is about the same as that of 1979-80 estimated sales.

In judging the degree of difficulty that might arise in the year ahead, it is instructive to review how the increased sales of 1979-80 were accommodated. Last year, we projected an increase of about 17 million metric tons over 1978-79, and we expected most of this increase to have to be moved by rail. Most observers felt that truck-barge traffic was beginning to be constrained by the capacity limitations of lock and dam 26 on the upper Mississippi River. We expected the total transportation system to be able to accommodate the projected level of exports, but we also expected continuation of complaints of rail-car shortages and river locking delays. There have been some such complaints, but those appear not to have been as many as in 1977-79.

Both railroads and water carriers have effected high rates of loadings in relation to exports (figs. 2-4). These high rates of loadings were attributable in part to relatively good weather last winter, less flooding of the rivers last spring, and more rail equipment (fig. 5). There likely were additions to barge fleets as well. New locking procedures instituted this fall at lock and dam 26 also helped to reduce waiting time there. Further, relatively more barged grain entered the river below lock and dam 26 in the past year than in other recent years. Finally, there have been additions to port handling capacities, both through improvements to existing facilities and to some new or reconstructed facilities beginning operations in 1980. These help to prevent unduly long waits at ports for railcars and barges.

Three developments in 1980 appear likely to have impacts extending into 1981. How serious these impacts will be and their potentials for creating transport shortages are hard to predict. One of these is the large increase in sales to Mexico; another is closing of certain rail corridors through actions connected with bankruptcies of the Milwaukee and Rock Island Railroads; and the third is the strong increase in demand of foreign customers for U.S. coal.

SALES OF GRAIN TO MEXICO

Sales to Mexico jumped sharply in 1980 by more than 160 percent over previous years. About 7 million metric tons of grains and other agricultural products were exported in the first 9 months with an additional 3 million tons to be shipped in the remaining months, based upon outstanding sales. The rapidly rising rail share of movements to Mexico, now 43 percent, accounts for most of the growth in total traffic to Mexico. Rail boxcar to hopper car shipments are running about 60-40. While turnaround times have been averaging 30 days for rail-owned cars and 60 days for private cars, they had not resulted in general shortages of railroad-owned cars as of mid-October. Rail border crossing conditions have improved in recent months as a result of substantial progress in documentation simplification and clearance procedures at the major border crossings.

A rail boxcar shortage could begin to develop over the next several months reflecting among other factors, continued high sales to Mexico in 1981, the relatively high level of U.S. railcars in Mexico in relation to other destinations, and the strained capability of the Mexican railway system to handle increased volumes of agricultural and industrial commodities. This is even more likely to occur if sales of corn and winter wheat to China are shipped primarily through Pacific coast ports where long rail hauls would require more car days. This would reduce the number of hopper cars available for the movements to Mexico. However, much of the wheat now being purchased by China is white wheat. This wheat is produced in the Pacific Northwest, and much of it is moved to Columbia River ports by truck-barge.

BANKRUPT RAILROADS

Cash flow problems developed in 1979 for the Rock Island Railroad following several weeks of strikes, and the railroad ceased operations. The properties of the Rock Island are to be liquidated. The Interstate Commerce Commission directed other railroads to provide service over Rock Island lines, and directed service has continued to present. Thus, the last year for which carloadings data for Rock Island lines are available is 1979.

The Milwaukee Railroad also is in bankruptcy. Some of the properties are to be liquidated, and some transfers have already been approved. Carloadings data for the Milwaukee, therefore, will not be for comparable traffic bases hereafter.

The tabulation below shows—in thousands—railcar loadings of grain for these two railroads in relation to the total of national railcar loadings of grain.

Year	Railroad		
	Rock Island	Milwaukee	All
1975	99	61	1,343
1976	86	58	1,323
1977	87	52	1,241
1978	95	64	1,341
1979	82	65	1,428

Source: Association of American Railroads,

It is not possible to determine if the lower level of loadings in 1979 on the Rock Island was due to the strike, the diversion of loadings to the railroads providing directed services, or other causes. There is potentially an adverse impact on the ability of shippers on both lines to market grain, but the overall impacts on grain loadings should be modest. Livestock feeding, an alternative to export of feed grains, and even wheat of certain types, is a transient activity that could relocate in response to changing transport conditions in local areas.

INCREASED SHIPMENTS OF COAL

Coal exports in 1980 are projected to be 85 million tons, 41 percent above 1979. Well over half of these exports are expected to move through export facilities in Hampton Roads, Va. The Washington Post of October 13, 1980, reported that 12,500 railcars loaded with coal and 6 million tons of empty ocean shipping capacity waiting for coal cargo were tied up in the Norfolk area. Such holdings of loaded cars and empty ships may surpass the highest level of congestion experienced in the grain trade in 1972-73 or since. Total coal production in 1980 is projected to be 825 million tons, a 7-percent increase over 1979.

The strong regional orientation of coal export flows—nearly all exports are through Baltimore and Norfolk—tends to insulate grain export needs from conditions in coal markets. Nonetheless, there likely are some interactions, and certainly there were some in 1973 when idle coal cars and coal-car dumping facilities on Hampton Roads were pressed into duty to move grain and in 1977-78 during the extended strike of Eastern coal miners when locomotives of coal-hauling railroads were leased to power-short railroads in Western territory. And some grain traders have suggested that the long queues of ships waiting to get loads of coal have made it more difficult to arrange for ships to haul grain. Increased coal movements do reduce the pool of shipping capacity immediately available for grain hauling, and cleaning costs tend to deter free movement of ships from coal to grain carriage.

This is a development that bears watching by the grain trade, but we do not now foresee significant impacts on grain export requirements in 1980-81.

MOVEMENT FOR DOMESTIC USES

FEED GRAINS, GRAIN MILL BYPRODUCTS, AND OILSEED CAKES AND MEALS

Feed grains, grain mill byproducts, and oilseed cakes and meals are heavily used in feeding livestock in locations other than on the farms where they are grown. Nonetheless, both cattle and hog feeding occurs primarily in areas with heavy feed grain and oilseed production. These are the livestock species that reflect the greatest variability in production levels from year-to-year.

Beef production is expected to be lower in 1980-81, than in 1979-80, as are pork and poultry production. Pork is produced primarily in Corn Belt States, and corn and protein supplements require only local movements. Poultry is heavily produced in Southeastern and Delta States, and requires the movement of both corn and protein supplements over relatively long distances.

The transient nature of livestock feeding was again illustrated this year, and likely will occur again in 1981. Relatively short supplies of sorghum grain in 1980 has led to more feeding of cattle with corn. However, this feeding is occurring in Corn Belt feedlots to save grain transportation costs.

PERISHABLES

The perishable commodities going to domestic outlets demand different transportation capacities than do the semiperishable grains, oilseeds, and fibers. Water carriers are insignificant as movers of perishable commodities, and the railroads had largely withdrawn from this activity.

Perishables add up to about 100 million metric tons per year—in order of volume: Fluid milk, red meats, potatoes, fresh vegetables, fruits, and poultry and eggs. Except for milk in bulk, all of these products utilize refrigerated, insulated van trailers, or mechanically refrigerated railcars. For many years, there had been diversion of this traffic from rail to truck. In 1979, the Interstate Commerce Commission exempted rail movements of fresh fruits and vegetables from economic regulation. Also in 1979, independent truckers who have hauled a sizable part of all fresh fruits and vegetables in recent years, engaged in work stoppages, and some violence occurred. These events, in concert with concerns about energy supplies and prices and perhaps other causes have resulted in some reversal of railroad shares of this traffic (table 2).

TABLE 2.—SHIPMENTS OF FRESH FRUITS AND VEGETABLES BY MODE OF TRANSPORT, 1978 AND 1979, AND MONTHLY 1980

[Weekly averages, 1,000 hundredweights]

Year	Rail	Truck	Total	Rail share (percent)
1978.....	915	7,322	8,237	11.1
1979.....	1,067	7,307	8,374	12.7
1980:				
January.....	1,106	7,160	8,266	13.4
February.....	1,097	7,478	8,575	12.8
March.....	1,145	7,736	8,881	12.9
April.....	1,476	7,706	9,182	16.1
May.....	1,223	8,403	9,626	12.1
June.....	1,709	9,402	11,111	15.4
July.....	1,381	7,843	9,224	15.0
August.....	858	6,785	7,643	11.2

Source: Economics, Statistics, and Cooperatives Service, U.S. Department of Agriculture. Agricultural Outlook. AO-56, p. 29, and AO-59, p. 39.

TRANSPORTATION RATES

Comparison of changes in railroad rates from the late 1940's into the 1960's, and again from 1969 up to the mid-1970's, has suggested that, on the average, agricultural shippers have borne smaller rate increases than have shippers of nonfarm commodities. Intermodal competition for this traffic was thought to be the reason for this result.¹ In fact, a look at available rate indexes for August 1980 (1969 =

¹ Gerald, John O. Competition in the Transportation of Agricultural Products, paper presented at the Symposium on Transportation Issues, the Mitre Corporation, McLean, Virginia, September 1975.

100) suggests that the same conclusion still holds (table 3). By August 1980, increases in farm product rates since 1969 amounted to only 92 percent as much as did increases on all rail traffic. Food product rates have increased at about the same pace as have all product rates. Since 1979, however, rate increases for grain have been larger than for any of the other groups shown in table 3, but farm product rates overall have continued to advance slightly less rapidly than have rates for all products.

Comparable rate indexes for those agricultural products moved by motor carrier are not available. However, there are some rates reported on a weekly schedule for the movement of fresh fruits and vegetables.

Fresh fruits and vegetables are harvested on a highly seasonal basis, and truck rates for produce shipped from California origins have reflected seasonal patterns consistent with harvest cycles. These rates usually rose from February through July, declined in August and September, increased again in October, and then decreased November through January, based on a rate analysis covering 1974-77.² Some-what the same patterns still exist (Fig. 6), so the deregulation of rail carriage of fresh fruits and vegetables in 1979 has not as yet modified the seasonal nature of truck rates. In fact, unregulated rail rates are thought by some persons to behave in the same pattern.

TABLE 3.—RAIL FREIGHT RATES: INDEXES FOR SELECTED COMMODITY GROUPS

Period	1969 = 100			Grains (December 1978 = 100)
	All products	Farm products	Food products	
1976	186.6	182.7	185.1	NA
1977	199.1	191.3	195.3	NA
1978	213.0	204.9	210.0	NA
1979	243.4	235.0	239.5	106.9
1980:				
January	264.7	257.4	260.6	118.7
April	279.7	267.8	276.0	126.2
July	291.7	276.1	290.7	128.9
August	292.4	277.8	291.5	130.4

Source: Department of Labor, Bureau of Labor Statistics.

CONCLUSIONS

The conditions of short supply affecting agricultural transportation from 1977 through 1979 appear to have eased somewhat in 1980. We expect conditions of relatively adequate supply of equipment to continue in 1981, although some spot shortages are likely to occur. Agricultural demands for transport services are expected to be at about the same level in 1981 as in 1980, but rail equipment and motive power will be greater in 1981 than in 1980.

In 1972, the Soviet Union unexpectedly entered the market for U.S. grains, and the equipment shortages created for agricultural transportation were especially intense for nearly a year, and shortages of equipment for immediate loading continued for another year. There is some possibility that a similar sequence of events could occur again in

² Gerald, John O. "Rates in the Trucking of Fresh Fruits and Vegetables," *The Vegetable Situation*, ESCS, USDA, TVS-210, November 1978, pp. 32-35.

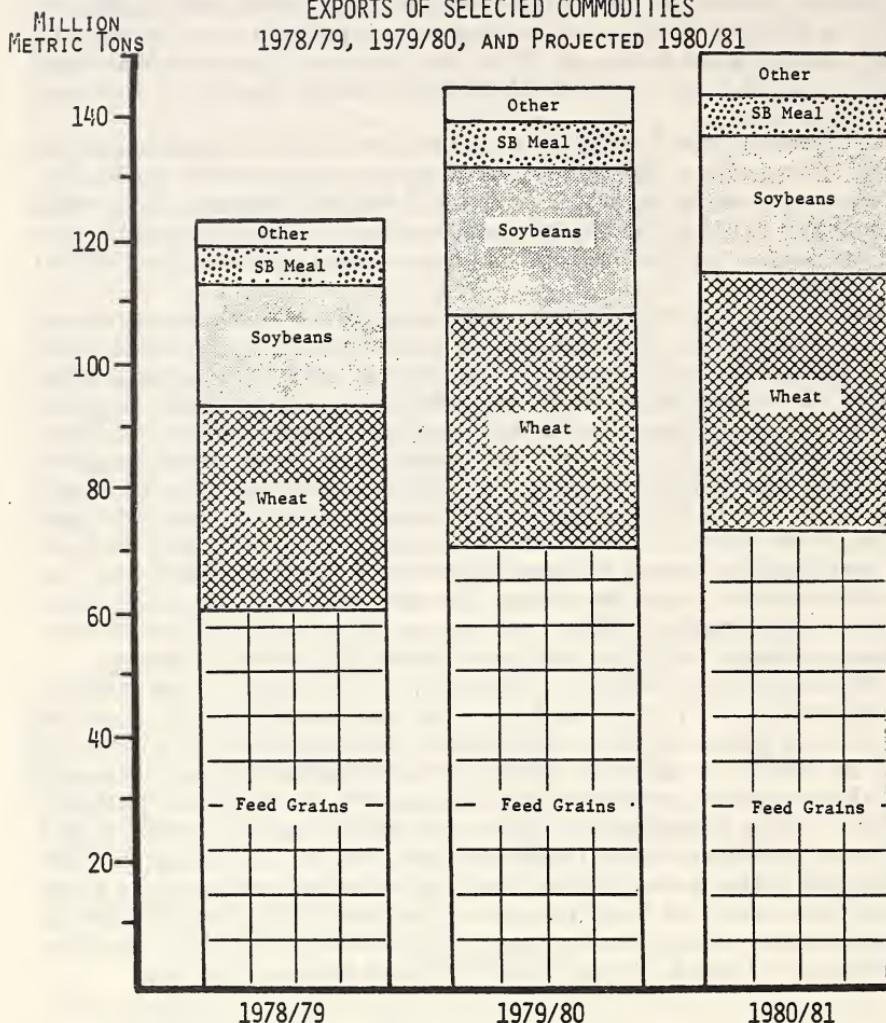
1980-81. However, the relatively low level of stocks now expected to exist at the end of 1980-81 suggests that unexpected attempts to make additional major purchases for export will generate strong price reactions. Ending stocks of wheat are now expected to be less than 25 mmt; and of feed grains, a little over 20 mmt. These contrast with stocks carried over into 1980-81 of 24.6 mmt of wheat and 51.9 mmt of feed grains.

At the same time, it is unlikely that exports will fall much below the levels shown above. There has been a deterioration in the world crop production prospects this fall, and world demand appears to be strong. It thus appears that the transportation industries have relatively more certain tasks to perform in 1980-81 than could be projected for 1979-80 a year ago.

The coming year will bring in some relaxation of Federal regulation of railroads and for-hire trucking of manufactured agricultural products. Deregulation will proceed over several years, and there is some degree of regulation to continue indefinitely. Agricultural shippers will face new challenges in adapting to these changes. Long experiences with unregulated trucking of raw agricultural commodities suggests that most agricultural shippers can adapt to nonregulation of trucking. There may be relatively more problems in adjusting to rail deregulation. New systems of contracting on commodity sales may have to be developed and used as new rail ratemaking flexibilities and rail service contracts come into being. New markets that can utilize alternative transportation links or modes may offer opportunities. Relocation of shipping facilities may prove desirable in some instances.

The deregulation-induced changes that will occur in agricultural transportation in 1980-81 and over the next several years cannot at this time be predicted. In some instances, transportation cost increases will be wholly or partially offset by other marketing cost decreases. In other instances, transport cost decreases will be wholly or partially offset by lower prices received from new outlets, and vice versa. About the only prediction about transportation costs in the year ahead that is feasible is that a deregulated trucking industry is expected by many economists to require fewer resources to accomplish a given transportation job than is a regulated industry. Some economists believe the same tendencies will exist for railroads, but some believe otherwise.

Figure 1
EXPORTS OF SELECTED COMMODITIES
1978/79, 1979/80, AND PROJECTED 1980/81



*OTHER INCLUDES COTTON, RICE AND SOYBEAN OIL

SOURCE: U.S. DEPARTMENT OF AGRICULTURE, WORLD AGRICULTURE SUPPLY AND DEMAND ESTIMATES, OCTOBER 24, 1980.

Figure 2
MONTHLY INSPECTIONS FOR EXPORT
ALL GRAINS JANUARY 1978 - SEPTEMBER 1980

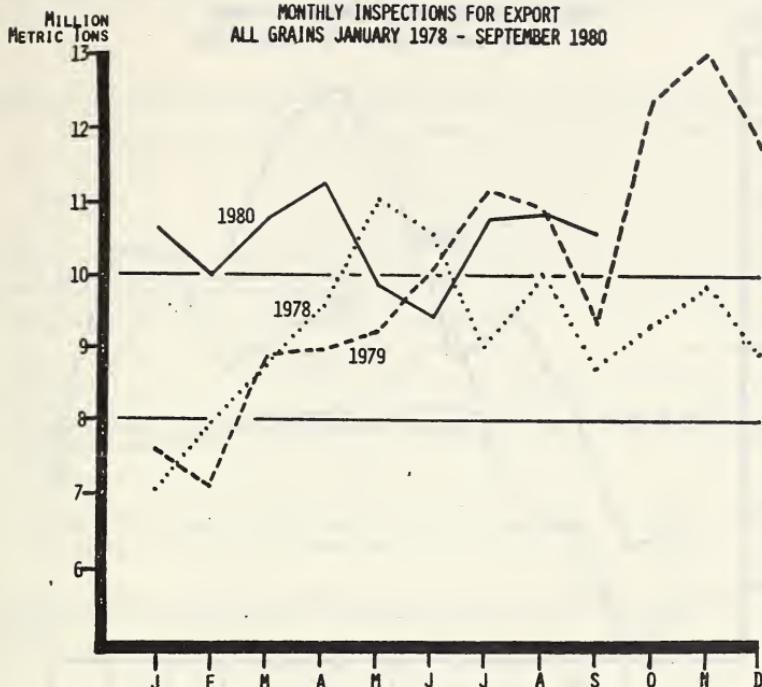


Figure 3
WEEKLY AVERAGE CARLOADINGS BY MONTH
ALL GRAINS JANUARY 1978 - SEPTEMBER 1980

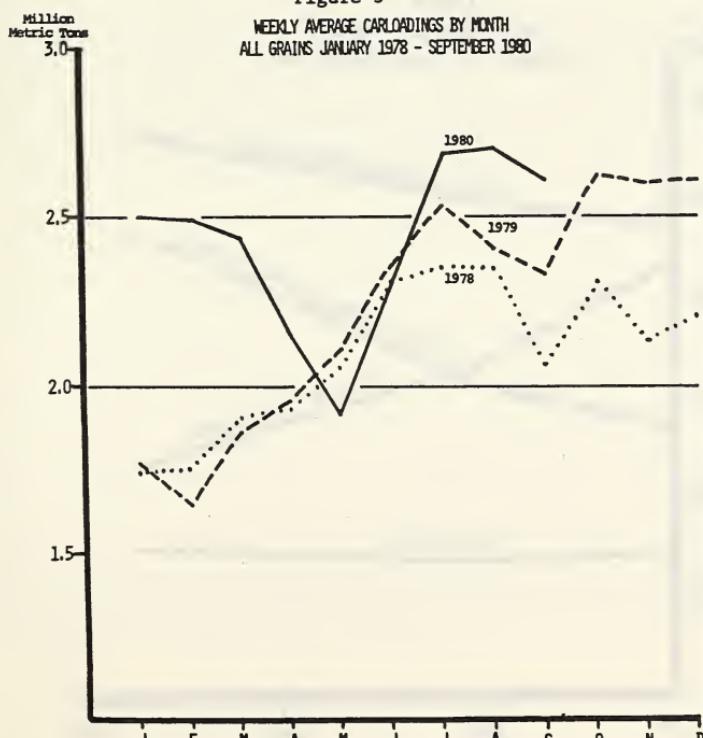


Figure 4

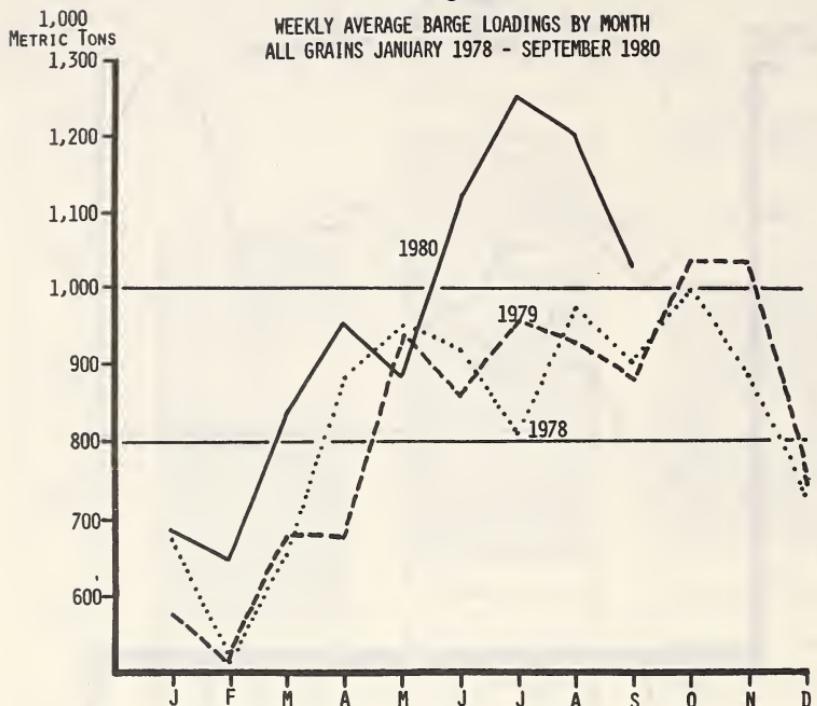


Figure 5

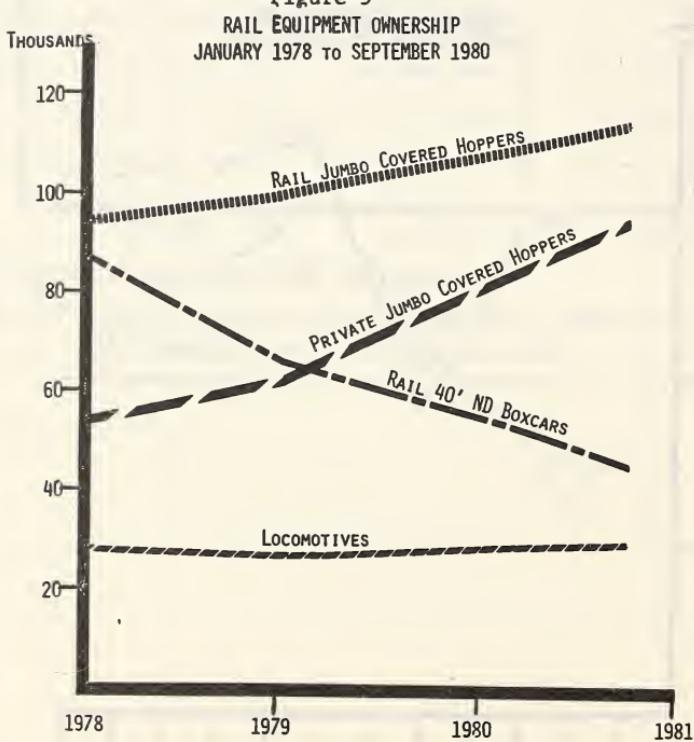
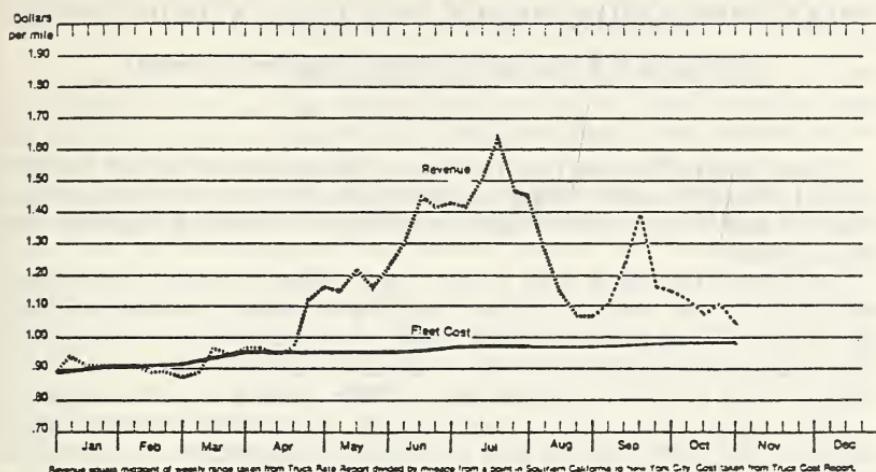


FIGURE 6.—Revenue cost comparison of fruit and vegetable truck movements
Southern California to New York



Revenue equals midpoint of weekly range taken from Truck Rate Report divided by mileage from a point in Southern California to New York City. Cost taken from Truck Cost Report.

TRANSPORTATION POLICY FOR THE UNITED STATES

(By Harold F. Breimyer, University of Missouri-Columbia)

It may seem after-the-fact to review transportation policy for the United States 1 month following enactment of a new rail transportation law and a few months after a similar path-breaking highway law was adopted.

The caveat to this is first that no law is firmly fixed for all time and policy by its nature is always subject to review; and second that the two new laws leave so much room for administrative interpretation and court decision that little contained in them can be said to be exactly fixed. But just to make my position candid without suspense, I add a third reason why transportation policy has not been truly resolved: the new laws will lead to so many complexities and so much rancor that modifications will prove essential within a few years. The rail law particularly is faulty.

For some time to come my identification with agricultural transportation will be tied to my service on the Rural Transportation Advisory Task Force, a congressional sponsored group that met during 1979 and issued its final report in January 1980. I do not report as a spokesman for the group. Neither does any other of the 15 members. We were in fact so guarded against having a standard bearer that we never named a chairman from among our membership. On a few issues I took exception to the majority opinion, but so did various other members. And lest any misinformation circulate, the task force report was in no sense a prototype for the highway or rail deregulation bills that later came into being. Neither the executive branch nor the Congress took its lead from us. In fact, we were not even accorded the courtesy of visible reception of the product of our work.

Nonetheless, in these few pages I report my ideas independently of the task force report, not in a strategic sense of concurring or disagreeing but as a different orientation. Among task force members I was the solitary philosopher, surrounded by 14 operating types. The other men, extremely competent in their technical capacities, saw transport policy as an extension of their operating experiences. As will be made evident below, my starting point is the opposite: I visualize the economy and what is desired for it and then ask where and how transportation fits in. Transport is often thought of as a way to move freight from one spot to another. I suggest this to be too prosaic. Transport is a means to make a geographically dispersed enterprise economy work.

In another respect I was the only task force member without an affiliation, obligation, or precommitment. Most were in fact chosen to

represent an interest group. The thesis, I suppose, is that perfectly balanced representation will yield a balanced output. Perhaps so; but I suggest that operating people can tell us best not where we want to go, but how to get there.

THE UNIQUE ROLE OF TRANSPORTATION

In papers I have written since serving on the task force I have emphasized above all the exceptional nature of transportation—its unique role, and its clumsy cost structure that is the source of so many of our woes.

The distinctive feature of freight transportation is simply that it is not a final product. I sometimes quip that no one ships a steer so that it can see the country. Nor, for that matter, is it shipped in order to give the carrier business. A steer or any other farm product is shipped because both the shipper and receiver need to have it shipped. This is no mere play on words; I am introducing a piercing principle, call it philosophical if you please, that transportation unlike most economic activity is more vitally essential to the user of the service than to the performer.

Transportation is an intermediate service. Its availability on acceptable terms is not incidental to businesses and regions; it is necessary to their very existence. By way of elaborating these principles I quote an old source and my own writings. Philip Locklin, that giant among transportation economists, loved to quote Beale and Wyman who observed many years ago regarding ratemaking in transportation: "The power to make freight rates is the power to turn a wilderness into a city or a city into a wilderness."¹

In a talk given at the University of Nebraska I said:

In an advanced industrial economy that is so geographically scattered as ours, transportation vitally links the parts together. It bridges the islands of economic activity. In a different idiom, transportation can be called the lifeblood of an economy.

To use still other language a carrier, as a trucking firm or railroad, may regard the performance of a certain carriage as optional. Whether that carriage is performed may not be optional to the shipper, or even the community. To either or both, it may be essential.²

The second exceptional feature of freight transportation is that its cost structure is dominated by overhead costs. This is a highly complicating factor, and the source of many contentious issues in transportation policy. Most troublesome of all is the overhead of right-of-way. Every right-of-way is a monopoly. This is true of a Burlington Northern Railroad Line, Interstate 70 that passes through my State of Missouri, and the Mississippi River. Notably, in highway and water transport Federal policy has served to avoid converting monopoly of right-of-way to monopoly of carriage. Secretary Bergland proposed just before the Presidential election that the same principle be applied to rail trackage. It would become a public resource and made available to several railroad companies, not just a single one. Incidentally, the

¹ J. H. Beale and Bruce Wyman, quoted in D. Philip Locklin, "Economics of Transportation," sixth edition, Richard D. Irwin, Homewood, Ill., p. 468.

² Harold F. Breimyer, "A Long Range Interpretation of the Transportation Dilemma," Univ. of Mo.-Columbia Dept. of Agr. Economics Paper No. 1979-45, p. 2.

advisory task force very nearly proposed the same idea as a fallback policy in the event its preferred recommendations failed to solve transport problems. In a second, final vote the majority shifted to the other side. But contrary to what appears in the final report, there was considerable sentiment on the task force for nationalization of road-beds in the event rail transport stays in trouble.

As another incidental note, section 2 of the rail deregulation bill carries the line that "most transportation within the United States is competitive." Congress has awesome powers but they do not extend to declaring that the Moon is composed of cheese or that transportation is competitive. Transportation by its nature has a considerable monopoly element.

But overhead costs are not confined to right-of-way. Power, freight cars, traffic management staffs—an enormous portion of the costs of transportation are overhead in nature and not affected appreciably by whether three or five trains run a day or each one has 50 versus 70 cars. What this leads to is discriminatory pricing, on what is known as the value of service principle or what the traffic will bear. In other words, the overhead cost is to be recovered where it is recoverable. Justification for the rule lies first in its practicality but second in the important fact known to theoretical economists, namely, that wisely chosen discriminatory pricing allows a broader and more complete bundle of services to be provided than is possible under any rigid formula for ratemaking.

For a century the Interstate Commerce Commission has stood guard to insure that discriminatory freight rates not be unduly discriminatory (the adverb "unduly" is crucial). That has been its central mission, its reason for being—though connected, of course, with quality of service provided.

The new rail law changes ratemaking rules. It first allows a great deal of ratemaking freedom. But it then reverses itself as Congress put limits on exercise of that freedom, doing so by specifying formulas for maximum rates. Even though I was glad to see a limitation added my smile was accompanied by tears. For what a formula! Rates are subject to ICC review if, where a railroad is dominant, rates exceed 160 percent of variable costs. The formula opens the door for all sorts of sleight of hand in classifying costs. What is the variable cost of adding one car of wheat to a train—on a branch line, on a main line, for short distances, long distance? It's whatever the accountant says it is. The complexities in applying such a formula, and the opportunities for protracted litigation, can make one's bones rattle.

Aside from the questionable workability of the formula, the course taken by Congress reminds of a principle I have observed during my 45 years of involvement in agricultural policy. Congress cannot successfully legislate the details of policy. It can only establish the general terms of policy. Administrators in the executive branch must be given the responsibility for tooling any economic policy. Congress broke that rule. I predict it will live to regret doing so.

I noted above that the ICC has traditionally had surveillance not only over rates but over the equally important companion to them, the kind of service offered. In some respects the new law is more devastating in abolishing that ICC activity than in the new ratemaking policy.

The heart of the matter is the authority for contract rates and abandoning the common carrier principle.

Again I cite history and tradition. The high overhead component to costs could readily allow not only ratesetting by whim, caprice, and predatory strategy, but an equal arbitrariness in the kind of service provided. So it has been that the ICC has said to railroad companies for a century—and to regulated truckers since 1935: If you set out to offer freight service to an area of our Nation you offer it uniformly, regularly, dependably; to big and small shipper, to big city and small town. You cannot pick and choose, and definitely once committed to provide service you cannot provide or withhold it whimsically.

THE NEW LAW AND THE COMMON CARRIER PRINCIPLE

The mandate I have just described is the common carrier principle. The principle fits with regarding transport as the lifeblood to smaller communities and smaller shippers/receivers.

The principle has become a casualty of the new railroads deregulation law. The law does not abolish it in so many words. It does so back-handedly. It endorses contractual freight services. Although it puts a limit on the relative proportion of contracting it also contains the devastating provision that in case of a crunch, contracts take priority over common carriage.

Bury the common carriage principle deep, and mark the grave with its cause of death, action of the Congress and Executive, 1980.

On this subject I get some wry humor. The advisory task force supported freight contracting. But it added that the common carrier obligation of rail carriers should be continued. I then aimed my dart: Giving priority to contracting and maintaining common carriage, I protested, are "incompatible." "If shippers armed with contracts get preference, some others will be left without service." The new deregulation bill proves the accuracy of my warning.

What we are going to get under the new rail law is a mish-mash of service and rate arrangements that will be incomprehensibly complex. Any semblance of uniform, preannounced, reliable rate structure will disappear. The situation will be exploited to best advantage by carriers and shippers who are most favorably situated, at the expense of all others. What carriers prefer is to move through-trains of freight long distances between terminal points. As that kind of shipment often does involve alternate carriers (there are several rail lines between Kansas City and St. Louis, for example), competition will likely exist there. It could be vicious. It could in fact prove predatory. I foresee the kind of rate and service structure that has emerged in decontrolled air travel. For air travel the 120 miles from Columbia to St. Louis the fare has skyrocketed to \$65. Yet at times one could fly from New York to Los Angeles for \$99.

The new rail law has another feature that gives cause for concern. It is the burden placed on aggrieved parties to petition for redress. This policy is wrong on principle: Government ought to enforce justice; it should not knowingly allow injustice to prevail subject only to protest by the victim. The policy is wrong for the further reason that only larger firms will have available the accounting and legal services that are necessary if corrective action is to be sought.

The rail deregulation law reeks of favoritism for large shippers, large receivers, large carriers, and terminal locations. For smaller shippers and more remote locations it promises severe problems and, in some cases, disaster.

In no sense do I oppose all features of the new law. Also, it must be admitted that the actual effect will depend in part on how the Interstate Commerce Commission administers it. But another flaw is the unilateral action allowed railroad companies in setting joint rates. And there are others.

How To Be HOPEFUL

If my negative judgments are at all justified, it is hard to account for the course of events leading to the new transport policy. Several of the "findings" in section 2 of the rail act are simply invalid. Worse, the act seems to be based on a non sequitur. Railroad earnings have not been adequate to assure good service, it is said, correctly. "Therefore, allowing railroads to earn more money will restore good service," is offered as a logical deduction. It is false. Railroads can earn more money in a thousand ways that do not constitute good service.

Much at fault, it seems to me, is the atmosphere that has prevailed in our Nation. A malaise, a disbelief that approaches nihilism, a growing factionalism in place of national unity, all these are involved. In 1979 when the administration proposed its rail deregulation bill I called it an exercise in irresponsibility, and pointed out that support for it came from opposite ends of the political spectrum. "Liberals favor deregulation," I wrote, "because they believe regulatory agencies such as the ICC only shelter their industries and gouge the public. Persons of opposite political view object in principle to public checking of private power."³

I have not touched on branch line abandonment or a dozen other issues. The principal deficiency, it seems to me, is an incapacity to address transportation in the broad view—intermodally, interregionally, and intergovernmentally. Decisions regarding branch lines ought not be made line by line, nor mode by mode. There is an interrelationship among various means of transport—it can be supportive, symbiotic, or disruptive, chaotic. To be sure, the various States are induced to set transport planning in motion but progress to date has been extremely patchy.

But the basic problem is that in the present mood we address the issues from the wrong point of view. I have remarked often that transportation must constitute a system. Our highways meet that test; our railroad flunk it. We do not have a single coast-to-coast rail line. Our rail system is truly a melange of short lines. A transport system must be planned. In a democracy both the agencies of government and the private interests involved have voices in the planning. And the object must be a system. This orientation—the word I used at the beginning of this paper—is what counts most.

In that regard I find myself respectful toward various heroic efforts by local interests to provide their local rail services. I approve

³ Harold F. Breimyer, "The Proposal to Deregulate Railway Transportation," "Economic and Marketing Information for Missouri Agriculture," University of Missouri-Columbia, May 1979, p. 4.

the new trial runs in cooperative short lines, modeled after the rural electric cooperatives. The advisory task force asked for experimental efforts of that kind. Yet the thought keeps nagging that we do not need ever more separate, uncoordinated providers of rail freight service. In my more acid moments I say we can forego more Toonerville Trolleys. So although I respect the efforts I have some reservation as to whether they go in the correct direction.

I doubt we want to nationalize all railroads—although some railroad companies (and railroad unions too) almost invite that action, by their intransigence. Therefore my best proposal is for a combined governmental-private governing board that sets the terms by which all rail service is provided. This would involve much telescoping of management. Definitely in my mind's eye is the combining of all freight cars, or at least the standard types, into a single carpool, managed centrally by computer control.

But what I plead for is philosophy. It begins with a recognition that the business of providing transportation is not like any other business. On the contrary, it is different from almost every other business. And the principal difference is that its essentiality puts it in the public interest. Not pronouncement by railroad presidents nor decree by the Congress nor declaration by executive officials can alter this basic fact. Until that fact is recognized and acted on, it is difficult to be hopeful.

FARM INCOME SITUATION AND OUTLOOK

(By George H. Hoffman, Economics and Statistics Service,
U.S. Department of Agriculture)

The economic situation in the farm sector in 1980 might be best described as volatile and diverse. Prices received by farmers fluctuated widely during the year while prices paid by farmers registered steady gains. Prices for some farm commodities reached record high levels this year while others fell to the lowest level in several years. Some crop producers enjoyed record yields while others faced severe crop damage from drought. For some farmers, 1980 may be their best income year ever. For others it may be their worst.

Low farm prices early in 1980 stemmed from large production and supplies. Excellent growing conditions in 1979 resulted in record large total crop production, up 10 percent from 1978 and almost 20 percent from 1976. Per-acre yields for the six major crops (corn, barley, sorghum, soybeans, wheat, and cotton) were the largest ever, a record unmatched since 1958.

Favorable returns to livestock and poultry producers in 1979 verified expansion plans for pork and broiler producers and was influential in halting the liquidation phase of the cattle cycle in 1979. By December 1979, the hog inventory was the largest since 1970 and producers were planning further increases. The long decline in dairy cow numbers ended and beef cow herds stabilized after 5 years of herd liquidation. Milk output per cow increased. By the fourth quarter of 1979 total meat and poultry production was approaching record levels. Livestock and poultry prices turned lower.

Coupled with large crop and livestock supplies in early 1980, the demand situation was not particularly bright. Transportation bottlenecks slowed movement of grain to river terminals and gulf ports. The suspension of additional grain sales to the Soviet Union dampened earlier prospects for record grain exports. Domestic demand also weakened as the economy slipped into recession. Consumer incomes fell and unemployment rose. Consumer prices jumped sharply in the second quarter, led by energy prices and interest rates.

Sagging farm prices in late winter and early spring created a severe cash flow problem for many crop farmers at planting time, as they sought short-term production loans in extremely tight credit markets. Between December 1979 and April 1980 prices received by farmers fell 6 percent while prices paid by farmers for production items over that same period rose 4 percent.

The situation began to change in May and June. It soon became apparent that the potential loss of exports to the Soviet Union would

be more than offset by expanded sales to other countries. After several months of financial losses, the March hogs and pigs report indicated lower pork supplies in prospect for the months ahead. Placements of cattle on feed continued to trail year-earlier levels, and there were indications of reductions planned for broiler supply flocks.

By mid-July it was obvious that heat and drought would have an adverse impact on yields of several major crops. The August 1 estimate of 1980 production of major crops was significantly below the July 1 indication. Crop and pasture conditions continued to deteriorate through August over many parts of the Corn Belt, the Southern Plains States, and the Southeast. By mid-August estimated yields of corn, sorghum, barley, oats, soybeans, and cotton were reduced sharply from 1979 record highs. Hot, dry conditions also slowed the rate of gain of cattle and hogs in feedlots and increased death losses in some broiler flocks.

Reacting to these developments, crop prices moved sharply higher, gaining 20 percent between April lows and October 1980. Feed grain prices rose almost 30 percent over the same period. Livestock prices also began to move sharply higher as meat production dropped seasonally, then fell below year-earlier levels in midsummer. Between May and August prices received by farmers for livestock products rose 14 percent.

Substantial increases in farm prices during the year, however, will only about offset the declines earlier in the year, leaving average prices received by farmers in 1980 about 2 percent higher than 1979. With prices paid by farmers increasing 11 to 12 percent this year, the resulting cost-price squeeze portends a significant decline in farm income for the year.

1980 CASH RECEIPTS UP

The decline in overall net farm income this year will be acutely felt by the livestock sector. Cash receipts for livestock products in 1980 are currently expected to total about \$69 billion, only slightly larger than the 1979 level. Prices received by farmers for livestock products will average the same or slightly less in 1980 than in 1979. Higher receipts from dairy products and broilers will about offset reduced receipts for cattle, calves, hogs, and eggs.

Cash receipts to dairy producers likely will increase 12 to 13 percent from 1979 levels reflecting an increase in milk prices this year of about 9 percent along with a 3-percent increase in milk production. Broiler receipts will also be up somewhat from 1979 as both broiler production and prices will average above year earlier levels.

Higher prices for cattle, hogs, and eggs during the summer will not offset the depressed levels of earlier in the year. Prices received by farmers for cattle will average lower than 1979. Total cattle and calf marketings will also likely be slightly reduced from last year, reducing cattle receipts. Hog slaughter will be up 7 to 8 percent this year, but this will be offset by lower farm prices, reducing hog receipts slightly from 1979. Egg production in 1980 will be about the same as 1979, but prices will average less, reducing cash receipts by 5 percent or more.

On the average, crop farmers will fare better than livestock producers this year. Crop cash receipts are currently expected to be up about 13 percent or more from 1979 and total around \$71 billion. All major crops will register an increase in 1980 with gains of 20 percent or more for receipts from corn, wheat, and rice. Only modest increases in cash receipts are expected for fruits, vegetables, and other minor crops.

Strong export demand, high feed demand early in the year and mid-summer prospects for a short crop all helped to raise overall prices received by farmers for crops in 1980 to average 7 percent or more above the 1979 level. Higher prices and larger marketings from last year's record production are contributing to the rise in crop receipts. By the fourth quarter of 1980, however, reduced marketings of feed grains, soybeans, and cotton will begin to offset some of the price strength, slowing gains in crop receipts.

Wheat receipts in 1980 are expected to be more than 20 percent over the 1979 record, reflecting a 10-percent increase in wheat prices and about a 10-percent increase in marketings. Feed grain receipts could be up a fourth or more from last year. Prices received by farmers for corn in 1980 may average about \$2.70 per bushel, a 35-cent per bushel gain from 1979. Although corn marketings will taper off sharply toward the end of the year, marketings in the first three quarters likely were at record levels from the 1979 crop. Higher prices for oats, barley, and sorghum will more than offset reduced production and marketings from smaller crops to be marketed in the third and fourth quarters of 1980. Total feed grain and hay receipts in 1980 could be a fourth higher than 1979.

Soybean receipts had earlier been expected to decline this year as a result of the 21-percent increase in the 1979 soybean crop and subsequent price declines. The farm price of soybeans, however, likely will average around \$6.70 in 1980, only slightly below last year. Soybean marketings will decline sharply late in the year, but soybean receipts may still total 8 to 10 percent higher than 1979.

Cash receipts for fruits and vegetables and other crops may only rise slightly this year. Reflecting large production, prices received by farmers for fruits during 1980 will average about 12 percent below a year earlier while vegetable prices will average about 2 percent lower. Larger marketings will more than offset price declines, but total receipts from fruits, vegetables and other crops may only rise about 5 to 7 percent.

In sum, total crop and livestock cash receipts may total around \$140 billion this year, a gain of about 6 percent from 1979 and 24 percent from 1978.

OTHER INCOME

In addition to cash receipts from the marketings of crops and livestock products, farmers also receive other cash income from farm-related sources such as machine hire, custom work, and recreational income. Income from these sources may total about \$2.3 billion in 1980 compared with \$2 billion in 1979.

TABLE 1.—PRICES RECEIVED AND PAID BY FARMERS, 1976-80
[Percent change from previous year]

	1976	1977	1978	1979	1980 ¹
Prices received:					
Crops	-2.0	-2.5	5.8	9.9	7
Food grains	-16.6	-22.8	22.4	19.9	12
Feed grains	-7.8	-18.7	4.0	12.7	16
Cotton	44.8	1.9	-9.3	5.3	16
Tobacco	.6	7.4	9.1	8.4	6
Oil crops	4.1	18.5	-7.0	10.2	-2
Fruits	-6.5	26.4	37.4	7.1	-12
Vegetables	-.6	9.3	5.1	4.9	-2
Livestock	2.9	-1.1	24.0	18.4	-2
Meat animals	.6	-1.2	34.5	23.9	-5
Dairy products	9.7	.5	8.8	13.8	8
Poultry and eggs	-.6	-2.2	6.3	3.8	NC
All products	.5	-1.6	14.8	14.8	2
Prices paid:					
Production items	6.0	3.6	8.5	14.3	11
Feed	2.1	-2.6	1.6	11.5	12
Feeder livestock	14.9	2.6	39.9	32.6	-3
Chemicals	8.8	-9.8	-6.4	2.0	18
Fertilizer	-14.7	-2.2	-.6	8.9	24
Fuels and energy	5.8	7.9	5.3	29.8	38
Farm/motor supplies	-2.4	.6	3.6	10.5	17
Autos and trucks	11.0	10.4	6.0	10.1	6
Tractors	11.3	9.7	8.8	11.6	12
Building and fencing	4.4	6.5	8.3	9.7	8
Services and cash rent	7.5	8.4	6.9	6.9	7
Production items, interest, taxes and wages	6.5	5.1	9.1	15.0	12

¹ Forecast.

Direct Government payments to farmers totaled \$1.4 billion in 1979, less than half the 1978 level, primarily because of reductions in deficiency payments under the feed grain and wheat programs. Direct Government payments during the first three quarters of 1980 were less than last year, but significant increases in disaster payments in the fourth quarter could raise the total for the year to \$1.2 to \$1.4 billion, the same or slightly less than 1979 levels. Higher disaster payments will continue into early 1981.

The nonmoney income category of the farm income account represents the rental value of housing provided by farm dwellings, and the value of farm products consumed directly in farm households. Including nonmoney imputations to farm income is consistent with procedures used by the Department of Commerce in the national income accounts, to allow comparison of personal incomes of farm and non-farm populations. This value may increase to about \$12 billion in 1980 compared with \$10.9 billion in 1979.

PRODUCTION EXPENSES HIGHER

There is usually a very close relationship between price changes in the general economy and prices farmers pay for their inputs. In 1980, the producer price index (formerly the wholesale price index) for all producer goods and services in the economy will rise about 14 percent from 1979. Prices paid by farmers for production items, interest, taxes, and wages will average about 12 percent higher than last year.

Prices paid by farmers for fuel and energy likely will average about 40 percent above last year but all the increase was in the first two quarters. Second half prices will average about the same as the first half. Sharp increases in gasoline and diesel fuel prices early this year along with declining farm prices are expected to result in some decline in total farm use of fuel and energy in 1980.

Fertilizer prices will be up almost a fourth this year. As a result of the sharp price increases early in the year and relatively unfavorable crop prices, fertilizer application rates were reduced, particularly for phosphate and potash. Nitrogen use may be slightly larger than a year ago, however. As a result, fertilizer expenditures likely will be up almost a fifth from 1979.

Prices for farm chemicals will be almost 20 percent higher than 1979. Use of pesticides in 1980 may have been slightly larger than 1979 since pesticides tend to be applied in fixed amounts and are not particularly sensitive to price changes.

Expenses for purchased livestock likely will be reduced from 1979 reflecting lower feeder cattle prices and the 10-percent decline in placements of cattle on feed in the first half of the year. Even with the 8-percent increase in placements in the third quarter and further increases in the fourth quarter total placements for the year would not significantly exceed 1979 levels.

Feed expenditures in 1980 will be up more than a tenth from 1979 reflecting an increase in feed prices of 10 percent or more and some increase in total feed use. Reductions in cattle feeding this year may about offset the increase in hog feeding, while poultry requirements will be higher.

Interest expenses will also be up substantially in 1980 due to higher interest rates and increases in the value of loans outstanding. Short term operating interest expenses could be up by a third from last year. Interest rates on long-term debt did not rise as much as on short-term production credit loans, but real estate interest expenses may still rise a fifth from 1979.

The 12-percent gain in input prices this year likely will translate into a 10- to 12-percent rise in total production expenses, depending on how farmers adjusted their input use in response to the low farm prices and high input prices earlier in the year. This would place total expenses in the range of \$131 to \$133 billion, compared with \$118.6 billion in 1979.

TABLE 2.—CASH AND NET FARM INCOME, 1976-80

[In billions of dollars]

	1976	1977	1978	1979	1980 ¹
Cash receipts:					
Crops	48.7	48.3	53.5	62.8	70-72
Livestock	46.1	47.4	59.0	68.6	68-70
Total	94.8	95.8	112.5	131.5	139-141
Other cash income ²	1.4	1.6	1.7	2.0	2.0-2.5
Government payments	.7	1.8	3.0	1.4	1.2-1.4
Total, cash income	96.9	99.2	117.2	134.8	143-145
Nonmoney income ³	7.3	8.3	9.2	10.7	11-12
Total, farm income	104.2	107.5	126.5	145.5	155-157
Production expenses:					
Total, cash expenses	68.8	74.4	83.4	99.0	109-111
Non-cash expenses ⁴	14.3	15.9	17.4	19.6	21-22
Total, production expenses	83.1	90.3	100.8	118.6	131-133
Net cash income ⁵	28.1	24.8	33.8	35.8	33-35
Net farm income before inventory adjustment	21.1	17.2	25.7	26.9	24-26
Value of inventory change	-2.4	.6	.4	4.1	-1-2
Net farm income after inventory adjustment	18.7	17.8	26.1	31.0	23-25

¹ Forecast.² Income from recreation and machine hire and custom work.³ Imputed rental value of operator dwellings and value of farm products consumed on the farm.⁴ Includes prerequisites to hired labor and depreciation of farm capital.⁵ Total cash income less total cash expenses. Represents cash income available for capital expenditures and operator income. Totals may not add due to rounding.

If farmers cut back on the use of some inputs this year, total production expenses would increase less than suggested by price increases. Total use of fertilizer, fuel, and labor likely will be reduced from 1979. Feeder cattle purchases also will be down from last year. The full extent of any reduction in input use will not be verified until 1980 production expenditures survey data become available in mid-1981.

FARM INCOME DECLINES

Even considering some moderation in the increase of input prices in the last half of 1980 and the strength in prices received by farmers, total production expenses will increase more than total income, reducing farm income. Net farm income before inventory adjustment is currently expected to total around \$24 to \$26 billion this year, down 5 to 10 percent from 1979. After inventory adjustment, the decline will be greater.

Earlier, increases in the value of the change in the cattle inventory and some increase in wheat inventories were expected to about offset declines in other commodities, but this now seems unlikely. Further downward revisions in the estimate of 1980 crop production point to a significant drawdown in farmer-held stocks of corn, soybeans, and cotton by the end of the year. Hog inventories at the end of the year will also be down from a year ago. The total value of the change in farm inventories in 1980 will be negative by \$1 billion or more compared with the unusually large increase in 1979 of over \$4 billion. Net farm income after inventory adjustment may total in the range of \$23 to \$25 billion this year, down 20 to 25 percent from the 1979 level of \$31 billion. More than \$5 billion of the decline will be due to inventory adjustment.

Cash flow is an important measure of the ability of farmers to meet shortrun obligations. This measure can be approximated from the farm income accounts by considering only cash income and expense items, leaving out imputed income and expenses such as the rental value of operator dwellings, the value of home consumption, the value of change in inventories, depreciation, and noncash labor expenses. The result is cash income available for capital expenditures and operator income. This cash income measure shows a somewhat different pattern of change over the past 3 years than net farm income. Net cash income in 1979 was about \$36 billion, an increase of only 6 percent from 1978 compared with the 19-percent increase in net farm income. Net cash income in 1980 may total around \$33 to \$35 billion, a decline of less than 10 percent from last year compared with the 20- to 25-percent decline in net farm income.

While the aggregate income measures point to significant declines in 1980, this does not reveal the significant differences in incomes this year of various groups of farmers. In general, crop producers will fare better than livestock producers this year. Even so, many dairy farmers are having a good income year while hog producers were in a severe loss position, at least through midyear.

The incomes of crop farmers whose yields were severely reduced because of drought in many parts of the country will be sharply reduced, even with disaster payments. Alternatively, many crop producers in the Lake States and Eastern Corn Belt had good yields, large production, and higher prices and consequently an improved income

situation. Actual producer incomes in 1980 also depend greatly according to the tenure of the operator, debt/equity position, and other factors.

1981 PROSPECTS

Net farm income seems likely to improve significantly next year, perhaps regaining all the loss of 1980. The 10-percent reduction in 1980 crop production along with continued strength in grain and oilseed export demand will keep crop prices well above 1980 levels. Given current prospects for increased exports and assuming no major weather-related disruptions or shortfalls in 1981 crops, overall crop prices in 1981 could average 12 to 16 percent higher than in 1980. Quantities sold in 1981 likely will be less than this year, but price increases will be offsetting, and crop cash receipts could rise 6 to 10 percent.

Livestock receipts are also expected to rise significantly in 1981 as total red meat and poultry production declines and prices move higher. The total supply reduction along with a stronger demand as consumer incomes show real growth during the second half of next year, currently point to a 16- to 20-percent boost in overall livestock prices and a similar rise in livestock receipts.

The 1981 outlook for cash receipts is based on current expectations of supply and price conditions for the individual commodities:

Wheat production was record large this year, 10 percent above a year earlier. Beginning stocks were also up from a year earlier, further increasing the supply available for marketing in 1981. Even with increased production, strong wheat export demand may keep average wheat prices 5 to 10 percent higher than in 1980.

This year's corn crop was down 17 percent from a year ago and exports could be larger, helping boost corn prices by a fifth or more from 1980.

Last summer's drought cut soybean production 22 percent from a year earlier, but reduced marketings in 1981 will be more than offset by higher soybean prices.

Although rice production was up 11 percent this year, prices will also be higher through 1981 as rice exports increase.

The cotton supply will be tight in 1981 reflecting the 23 percent drop in this year's production. Cotton exports and domestic use will also be smaller, and only small increases in ending stocks are likely in 1981.

This year's tobacco crop is 17 percent larger than the 1979 disease-reduced crop, but the crop is still smaller than 1977 or 1978. Prices are expected to average above 1980 levels in 1981.

Total citrus production will be record large this year with a record orange crop and more lemons, but a slight reduction in grapefruit production. Noncitrus production is also up from last year with record production of apples and grapes and more pears. Grower prices likely will trend lower, at least through early 1981.

Vegetable acreage was down this fall and production declines are expected for most major vegetable crops. Higher grower prices likely will more than offset production declines.

Beef production may increase only slightly in 1981 as herd rebuilding continues. Feeder cattle and fed cattle prices may rise sharply by midyear.

Hog prices in 1981 will also rise sharply as production falls from the record level of 1980. Hog receipts will rise substantially.

Higher beef and pork prices will also boost 1981 broiler and turkey prices above 1980 levels even though production will also be on the increase again.

Egg production may decline slightly in the first half of 1981 but prices likely will rise and be offsetting, raising receipts modestly for the year.

Milk production in 1981 is expected to rise at least 1 percent and prices could rise by about 10 percent, boosting receipts by 10 percent or more.

Production expenses in 1981 may increase 10 to 13 percent from 1980. Unlike 1980, however, farm origin inputs will rise more than other expenses, under pressure from increases is the price of feeder cattle and feed. Petroleum-based inputs such as fuel, fertilizer, and chemicals likely will also register significant gains in 1981, but the lower inflation rate expected in the general economy should moderate price increases for manufactured inputs and hold down interest rates.

Feed expenses in 1981 could be up 15 percent or more from 1980. Hog inventories will be smaller next year but more cattle are being fed. Total feed grain use for feed is currently expected to be down around 7 percent during 1980-81, but higher feed prices will be more than offsetting.

Expenses for purchased livestock may also be up more than a tenth in 1981, reflecting significant increases in feeder cattle and feeder pig prices and some increase in placements of cattle on feed.

Fertilizer and farm chemical prices will be heavily influenced by energy prices. Decontrol may add around 10 cents per gallon to gasoline prices next year. OPEC decisions would further add to the increase. Even with some conservation in total farm energy use in 1981 total fuel and energy expenditures could be a fifth higher than 1980. Fertilizer and farm chemical prices likely will move up with fuel prices, but at a slower rate.

Total interest expense in 1981 may not increase significantly from 1980 levels. Interest expense on short term production loans may be reduced from 1980 as increases in short-term debt outstanding may not fully offset lower average short-term interest rates. However, interest expenses on real estate loans likely will continue higher in 1981 as land values increase and the average interest rate on long-term debt stabilizes at relatively high levels.

Given current expectations of 1981 crop and livestock prices and sales, total cash receipts and gross farm income would rise more than production expenses and net farm income after inventory adjustment in 1981 could be in the range of \$27 to \$32 billion. Nonmoney and other income is assumed to increase at about 11 percent, slightly more than the overall price increase in the general economy. Government payments, however, are not expected to be significantly larger than in 1980.

This forecast also assumes more normal weather conditions next summer which would lead to higher crop yields and larger total crop production than in 1980. Larger crops, continued increases in the cattle inventory and no further decline in hog inventories in 1981 would suggest a increase in the value of the change in inventories, which

could contribute \$1 to \$2 billion to net farm income. Thus, net farm income before inventory adjustment and net cash income will increase less than the increase in net farm income after inventory adjustment, but may still be up a tenth or more from 1980.

Although supply and demand factors influencing crop and livestock prices and supplies are fairly well established through the middle of 1981, prospects for the second half of next year remain highly uncertain. Southern hemisphere crop production will impact export prospects this winter, and by next spring the new wheat crop and prospective plantings will begin to influence prices. Nearly half of 1981 wheat receipts will come from 1981 wheat production and more than a fourth of the corn, soybean, and cotton receipts will result from the 1981 crop which is not yet planted.

Weather developments in the United States and abroad will have a significant impact on second-half 1981 crop receipts. Livestock production, particularly broilers can adjust rapidly to new developments in feed prices. Hog producers can still change their plans about the spring pig crop, impacting second-half pork production. In general, poor weather conditions in mid-1981 would hold down crop yields and raise prices. Usually, reduced production is more than offset by price increases, leading to higher cash receipts. Although higher crop prices would also raise feed costs somewhat, net farm income would tend to be slightly higher if crop production remains low. Alternatively, bumper crops, lower crop prices and high meat production in late 1981 could leave net farm income near the lower end of the forecast range.

NEW FARM SECTOR ACCOUNTS TO BE REPORTED

The farm income situation in 1980 illustrates the limitations of a single aggregate measure of economic conditions in the farm sector. Fundamental structural change in agriculture has increased the diversity of farms. As a result, aggregate economic measures are increasingly ineffective in providing insight to the economic conditions of the various subgroups of farmers.

In December, USDA's Economics and Statistics Service will introduce a new set of indicators which are expected to overcome several limitations of the old sector accounts, primarily by establishing a framework for later presenting income and balance sheet information for various subgroups of farmers.

The new sector accounts will introduce a number of changes in methodology and reformatting of data. One of the primary changes is the separation of the farm production sector from the farm households. This means, for example, that income and expenses associated with the operator's dwelling will be excluded from the transactions and balance sheet statistics of the production sector. The new accounts will also treat CCC transactions as loans rather than cash receipts, as is now the practice. The new accounts are consistent with the national income accounts prepared by the Department of Commerce and are designed to be flexible enough to eventually expand the aggregate accounts to include more information on farms by size, type, ownership, and location.

The new farm sector accounts will be published in a series of statistical reports entitled "Economic Indicators of the Farm Sector." The first of these will contain national income and balance sheet statistics under the new methodology, in addition to the traditional income and balance sheet statistics formerly published in the "Balance Sheet of the Farming Sector" and "Farm Income Statistics."

This year the new sector accounts will include data for 1977-79 on the financial status of the farm sector, production transactions, cash flow, and operators' income. Next year a longer historical data series will be presented. Subsequent bulletins in the "Economic Indicators" series will include State-level income and balance sheet statistics, productivity data, as previously published in "Changes in Farm Production and Efficiency," and a new statistical bulletin carrying cost of production estimates for crop and livestock enterprises.

Publication of the new accounts marks the first step in a longer term program of developing and implementing more comprehensive and informative measures of the economic performance and well-being of the farm sector. A major part of this upgrading process is to identify and collect new data so that the aggregate accounts can be expanded to provide more information on farms by type, size, and location, and on other subsector groups. During the next few years, statistics under the new sector accounts will be published, in addition to all the traditional measures of net farm income currently used.

FARM INCOME OUTLOOK

(By Marvin Duncan, Assistant Vice President and Economist, Federal Reserve Bank of Kansas City)

I am pleased to participate in the 1981 Agricultural Outlook Conference as a discussant for the paper on farm income. This is a year of retrenchment for farm income, as indicated by George Hoffman's excellent and comprehensive paper. And although the reasons for that retrenchment have been debated at some length during the year, opinions have been far from unanimous.

However, for a careful observer, this retrenchment was rather clearly signaled, as early as September 1979. It ought to have been clear to agricultural producers that the excellent summer and fall grain crop prices—food and feed grains, especially—could not continue through the 1979/80 marketing year without some assistance from the demand side, such as reduced production somewhere in the world. Nonetheless, many producers held grain for sale until after January 1, 1980. Moreover, hog and poultry inventory numbers clearly pointed to sharp increases in total meat supplies during 1980. Yet that buildup was on the increase as 1980 began.

On the input side, price increases in farm production items escalated during 1979 in response to rapid increases in energy prices and a quickening in the rate of general price inflation. Thus the stage was set, as 1980 arrived, for a farm recession. That recession resulted from a number of major farm commodities reaching the low points of their respective price cycles more or less simultaneously and from general price inflation that drove input costs sharply higher. If there was any doubt in the minds of agricultural producers that they were being disadvantaged by inflation, the experience of 1980 ought to have convinced them.

However obvious an impending farm recession should have been, the popular perception of its onset was about concurrent with the President's announcement of a partial suspension of grain sales to the U.S.S.R. That event, more than any other in early 1980, was the rallying point for farmers and their elected representatives in decrying the farm recession. In retrospect, of course, that embargo was not much more than incidental in its effect on U.S. farm income. Certainly, a few producers may have sold grain at low post-embargo prices. But, for the most part, it is likely that little grain changed hands until after prices had rebounded. In retrospect, grain prices may have been strengthened in the spring of 1980, by USDA action to offset the effects of the embargo, beyond what they would have been without an embargo.

The farm recession was short-lived, however, and by shortly after midyear, a combination of cutbacks in livestock production and the prospect of drought-reduced crop production turned farm product prices around. On the cost side, the rapid price inflation of early 1980 eased substantially during the latter half of the year.

I find little to disagree with in Hoffman's discussion of 1980 cash receipts, although I might have expected slightly higher cash receipts than the \$140 billion he projects. Higher grain and livestock prices—despite declines in grain output—might be expected to bring the cash receipts in a little higher, perhaps as much as \$1 billion.

On the input side, the 10–12 percent increase in costs could possibly overstate actual increases. Some 1980 inputs, such as fertilizer, were purchased in 1979, and farmers may have reduced input use more than realized during the current year. Thus, while the net income figures before inventory adjustment of \$24–26 billion are nearly consistent with my expectations, I think the actual figure may be about \$26 billion.

The extent to which inventory adjustment will reduce total net farm income is greater than earlier projections indicated. To achieve a negative adjustment of \$1 billion or more will require sharp reductions in grain inventories during the fourth quarter of 1980. This is particularly true in view of substantial price increases for grain and cotton.

I agree with Hoffman that the income decline in 1980 is not uniformly distributed. Pork and broiler producers will have a particularly bad year. Cattlemen will not be very pleased with their margins, either. Dairy farmers will only hear about the farm recession second hand. However, the adverse effect of the summer drought on farm income has probably been overstated. Price increases for grain crops have been sufficient to offset production declines for most agricultural producers. In fact, the drought greatly benefited many grain farmers. However, for those producers who lost a third or more of their production to drought, price increases may not be offsetting.

Farm income in 1981 ought to rebound substantially from 1980 levels. In fact, I would not be surprised if net income recovered most of the decline of 1980—perhaps to the \$27–30 billion range. I think the stage is almost set for volatile feed grain prices in 1981 with \$4.50 per bushel or higher for corn possible for limited periods, if production problems surface. Soybean prices will be substantially stronger and a poor crop in the Southern Hemisphere could add \$1 to \$2 per bushel to prices. Wheat and cotton prices will be strong as well. It seems likely that livestock price increases will much more than offset production cutbacks—with any reasonable level of consumer demand.

Most input costs may increase moderately in 1981. However, livestock and feed costs for livestock producers may increase substantially, narrowing their profit margins. Additionally, petroleum-based inputs may increase in price more rapidly than now expected.

It is useful to examine farm income trends in constant dollar terms to remove money illusion. When that is done, the extent to which real net farm income has deteriorated during the past half decade, as a result of price inflation, is startling. In terms of purchasing power, net

farm income this year is lower than at any time since 1945. Moreover, if farm income recovers next year to near 1979 levels, it will still lag 1979 in constant dollars by a substantial amount. Current inflation rates are rapidly shifting the mix of farm income toward one in which unrealized capital gains from real estate make up a larger proportion of total farmer profits. And that suggests the resilience of some farm businesses to farm price fluctuation is deteriorating.

I've been interested as to why farmers appear rather sanguine about the decline in net income this year. Certainly, we heard a good deal from them earlier in the year, and correctly so. I have concluded that the answer may be found, in part, with the net cash income data. With net cash income in 1980 off by 4 percent from a year earlier, farmers may think they are better off than the net income data would suggest.

Another explanation could be that farmers have made greater shifts among inputs than we currently realize—and, as a result, USDA data underestimate farm income by overestimating production expenses.

Perhaps, the ready availability of soft credit from the Farmers Home Administration (FmHA) or the Small Business Administration is defusing the more serious credit problems. Data from the 10th Federal Reserve District indicate agricultural bankers expect almost twice the usual proportion of their farm customers to be ineligible for normal bank or Production Credit Association credit in 1981. However, due to the widespread availability of FmHA disaster loans, fewer farm customers than normal may be forced from business due to credit problems.

Finally, not all farmers face the same cost structure. Those with little debt or with land purchased at much lower than current prices may be enjoying substantial profits, while more heavily leveraged or more recent entrants may be having financial difficulty.

All this diversity emphasizes the importance of disaggregating the farm sector accounts. USDA efforts in this direction are welcome additions to available data series. But how carefully the disaggregation is done will determine the reliability of the new data. With farm structure changes occurring and with changes in input mixes, it becomes very important to disaggregate using current information, rather than baseline relationships that may no longer be valid. Thus, additional USDA resources must be allocated toward developing and maintaining disaggregated data series, if they are to prove useful and reliable.

In conclusion, during 1980, the agricultural sector experienced a sharp, but brief, recession that bottomed shortly after midyear. I expect net income to farmers in 1980 to reach the upper range of USDA projections. Conversely, in 1981, I am somewhat less optimistic about net farm income than the USDA. Finally, while new measures of farm well-being and disaggregated data series are welcome, such series place much greater demands on data integrity.

AGRICULTURAL FINANCE OUTLOOK

(By Dean W. Hughes, Economics and Statistics Service, U.S. Department of Agriculture)

My purpose here today is to review the financial conditions of the farming sector through 1980 and then discuss the expectations of the U.S. Department of Agriculture (USDA) for 1981. It will be difficult to capture all of the events that have taken place in agricultural finance over the last year and still have time to adequately deal with likely conditions for 1981. I will, therefore, provide only a brief mention of some of the major changes in agricultural finance for 1980 and then move on to discuss our forecasts for next year.

A REVIEW OF 1980

Nineteen eighty has been a year of unprecedented extremes in all financial markets. The prime interest rate, the rate of interest that large urban banks charge their most preferred customers, hit a peak in April of 20 percent—the highest it has been since the Civil War. It then declined rapidly, hitting 11 percent only 13 weeks later. As this was happening, the real sectors of the economy went through the shortest recession of the postwar period. Real gross national product declined at an annual rate of 9 percent in the second quarter, but rebounded to increase at an annualized rate of 1 percent in the third quarter. Thus, the volatility of the economy has dramatically changed over the year, leaving economic forecasters at a loss. This is not to say that there were no warnings of the uncertainties of 1980 or of the impacts of these changes on agriculture.

Banking conditions

A little over a year ago, the Federal Reserve System, faced with rapidly rising rates of inflation, announced a change in its methods of implementing monetary policy. In October 1979, the Federal Reserve Board of Governors decided to concentrate the efforts of the system on meeting targets of growth in monetary aggregates while allowing interest rates to fluctuate more than in previous years. By January, the prime interest rate had risen to over 15 percent and yet the money supply was still growing at an annual rate of about 7 percent due, in part, to large increases in consumer and producer borrowing. The Federal Reserve System then imposed temporary credit controls on the banking system in February 1980. These controls proved extremely effective in slowing the growth of credit and were removed in June. According to the most recent Federal Reserve System data on the flow of funds consumer borrowings went from \$23 billion in the first

quarter of 1980 to \$7 billion in the second quarter. Borrowing by businesses also declined substantially, allowing interest rates to fall dramatically. More recently, interest rates have started to increase again, with the prime interest rate reaching 15.5 percent in early November. The new operating procedures of the Federal Reserve System have produced wide fluctuations in interest rates over the last year. Until inflation is brought under control and stabilizes at lower rates, all sectors of the economy will have to adjust to an environment where future interest rates are less predictable.

Given recent legislation, rural borrowers will likely have a much greater change in environment to cope with over the next few years than their urban counterparts. The Depository Institution Deregulation and Monetary Control Act of 1980 will have substantial impacts on rural banks. The act removes controls on interest paid on deposits by 1986, imposes reserve requirements on demand deposits for all banks, removes reserve requirements on time deposits, and preempts State usury laws, setting usury limits at five percentage points higher than the Federal Reserve discount rate. These changes will have two major impacts on agricultural banks (banks which have a major portion of their loan portfolios in farm loans). First, fewer dollars will leave rural credit markets in periods of high interest rates. Since banks will be able to increase interest rates on deposits to be consistent with rates available on alternative investments, disintermediation will be curtailed in the future. This will reduce the frequency of periodic credit shortages in rural areas. While this is a highly desirable goal it cannot be accomplished without some associated costs. Which brings us to the second impact of the new legislation: interest rates on farm loans will be higher and more volatile. Even though the introduction of money market certificates of deposit has already made rural banks more responsive to changes in interest rates, the act removes all of the insulation from fluctuations in national money market interest rates that rural credit markets have enjoyed in the past. It also imposes a responsibility on all of us working in agricultural finance. We must work to make the monetary authorities increasingly aware of the greater impacts that their decisions will have on farmers' production and investment decisions.

Farm sector financial conditions

This year has provided an excellent example of how farmers and ranchers are affected by changes in financial markets. The importance of farm credit has been slowly increasing over the last 30 years. The farming sector's debt-to-asset ratio has grown from 8.5 percent in 1951 to 17.1 percent on January 1, 1980. The growth in real estate debt and nonreal estate debt have been almost equal over this time. Nonreal estate debt has increased for several reasons, some of which have been:

Lower real rates of interest coupled with an increasing financial sophistication of farmers.

The need for intermediate term credit to finance capital expenditures made to mechanize agricultural production.

Ever increasing quantities and prices of purchased inputs.

Decreasing profit margins. In 1950, net farm income was 40 percent of gross income. By 1980, however, net farm income accounted for only 20 percent of gross income.

Real estate debt has grown because:

Lower real rates of interest coupled with an increasing financial sophistication of farmers.

An increasing fraction of the returns to farming have come as unrealized appreciation of real estate assets. To generate cash flow, real estate debt has been used to "cash in" on some of this appreciation.

In years of poor net farm income, operating loans have been refinanced for repayment over several years using real estate as security. If the length of repayment exceeds the time between low income years, then these loans accumulate.

The decade of the seventies brought a revolution in farmers' reactions to debt financing. Previously, farmers reduced debt outstanding in years of good farm income. As recently as 1968, nonreal estate debt declined. Yet in the 1970's farm debt increased every year, and the rate of growth has been accelerating. It is not hard to understand why farmers have relied more heavily on debt financing in recent years. Real interest rates have been very low, or negative, for most of the decade. Because of this, debt financing by all sectors of the economy, including agriculture, has grown substantially.

The 1980 credit conditions

At the beginning of 1980, farmers were more dependent on debt financing than at any other time in the postwar period. The sector's debt-to-asset ratio was higher than at any time since 1941. Moreover, interest expenses account for about 10 percent of all production expenses. Consequently, large swings in interest rates can have substantial impacts on net farm incomes. Both the timing and the magnitude of interest rate fluctuations in 1980 have been problematic for farmers. Interest rate peaks occurred coincidentally with crop producers' borrowing needs for planting. Livestock producers were also hurt since they had just begun building herds after several years of poor income, and interest expenses represent a large share of inventory carrying costs. In some sense, higher interest rates caused farmers' financial problems in 1980 by increasing their costs of doing business. But equally important to farmers is the ability to obtain the credit in a timely manner to finance their production.

Two groups of farmers had difficulties obtaining credit from private lenders in the spring of 1980: Those who were not creditworthy and those in areas where credit shortages appeared. Throughout the United States there are farmers who are under financial stress even in good years. With all production expenses, including interest, increasing faster than expected receipts in 1980, many of these farmers were denied credit because it was unlikely that they would ever be able to repay it.

The second group of farmers who found it difficult to find credit were financially sound. Several events combined to create regional shortages of credit from private lenders in the spring of 1980. In the northern and western edges of the Corn Belt many profitable farms had difficulty obtaining loans because:

Seasonal borrowings for grain production coincided with credit constraints imposed to fight inflation.

Transportation problems created large differences between grain prices at central markets and local grain elevators. In expectation of higher local prices, some farmers delayed grain sales, reducing the cash inflows normally available to banks in these regions.

Only 20 percent of crop producers participated in the 1979 Government crop diversion programs and were therefore qualified for Commodity Credit Corporation loans.

The area's commercial banks were experiencing historically high loan-to-deposit ratios at the start of the year. Rising interest rates had also decreased the value of bond portfolios, so banks were extremely illiquid.

The region had historically relied on commercial banks to provide a greater fraction of their short-term loans than other areas of the country.

The Farmers Home Administration's economic emergency loan program was scheduled to expire in May 1980 and most allocations had already been obligated.

The combination of applications from creditworthy borrowers and marginal farmers denied loans at commercial banks and the Farmers Home Administration overburdened the loan processing abilities of other lenders.

Congress and the USDA took two major actions to respond to the complaints of farmers unable to find credit. In March, the Farmers Home Administration's economic emergency loan program was extended through September 1981, and \$2 billion of additional allocations were provided by Congress; \$1 billion of these funds were immediately made available to farmers and targeted to States under the most financial stress. In addition, Commodity Credit Corporation crop loans were made available to farmers who did not previously qualify. These actions helped farmers plant 3.5 percent more acres in 1980 than they planted in 1979.

The midsummer drought hit hardest in North Dakota, South Dakota, Minnesota, Wyoming, Montana, and Texas. Just as Farmers Home Administration economic emergency lending started to slow, loans for natural disasters began increasing. For those farmers not affected by the hot, dry weather, income prospects were improved by the drought. Others face severe financial problems in repaying loans made at high interest rates with very low farm incomes. But Government disaster relief programs have already been activated to help alleviate some of the problems. Over 950 counties in 20 States have been declared eligible for Farmers Home Administration emergency disaster loans, and over 440 counties have qualified for ASCS disaster payments. More than \$6 billion is expected to be provided to farmers whose output was substantially decreased by the drought.

Higher interest rates, credit controls, and low expected farm incomes have had an impact on capital inputs as well. Sales of farm tractors and combines were 45 percent below year-earlier levels in April. Land prices leveled out or declined in some parts of the country. The Chicago Federal Reserve's quarterly agricultural survey showed average land prices in the district decreased by 2 percent between

January and June 1980, bringing the year-to-year increase to only 3 percent. A nationwide American Bankers Association survey of their members showed that bankers felt real estate values for the Nation had only increased by 5 percent from January to June 1980. And the respondents felt that land prices would only increase by an additional 7 percent by the end of the year. This is a slower growth rate than recent years when incomes and interest rates have been more stable. Real estate values increased by 15 percent in 1979 and 14 percent in 1978, for example.

PROSPECTS FOR 1981

The USDA expects farm income to improve significantly in 1981. Aggregate net farm income is expected to increase about 20 percent, falling somewhere in the range of \$27 billion to \$32 billion. This compares to preliminary estimates of about \$23 billion for 1980. Increases in income will likely be widely dispersed across most agricultural commodities.

Projections of interest rates

Forecasts of interest rates require forecasts of both the supply and demand for credit in the general economy. The demand for credit will be a function of the strength of the recovery from this summer's recession and the growth in economic output in 1981. Current signs suggest that a very strong recovery is already underway. Gross national product (GNP) declined substantially in the second quarter of 1980. But the third quarter showed an annualized increase of 1 percent. And forecasters suggest that the fourth quarter will have GNP growing at 2 percent.

Continued fiscal stimulus is very likely for 1981. The President-elect and a large fraction of the Members of the new Congress are in favor of cutting taxes next year. Many Government programs are indexed to inflation. Given the lags in funding these programs, the inflation of 1980 will trigger increased Government spending for 1981.

I do not intend to embroil this presentation in the debate over whether current tax cuts will help to balance the budget in the long run. It is clear, though, if tax cuts are implemented next year, and coupled with already legislated increases in expenditures, there will be a substantial Government deficit in 1981. The stimulus of the deficit will likely add to business expansion and the demand for credit.

The supply of credit is primarily determined by the Federal Reserve System (FRS) through its implementation of monetary policy. While the direction that the FRS will take in providing money can be projected by studying their stated targets, the timing and magnitudes of their shortrun actions are very difficult to forecast.

Figure 1 shows the level of the money supply (M1A, defined as currency plus private demand deposits) from September 1979 to November 1980. The FRS had the objective of having M1A grow at a rate of 3.5 to 6 percent during 1980. While they may still end the year very close to that goal, you can see that there have been substantial variations in intrayear growth rates. And figure 2 shows how sensitive short-term interest rates have become to changes in short-term growth rates of the money supply.

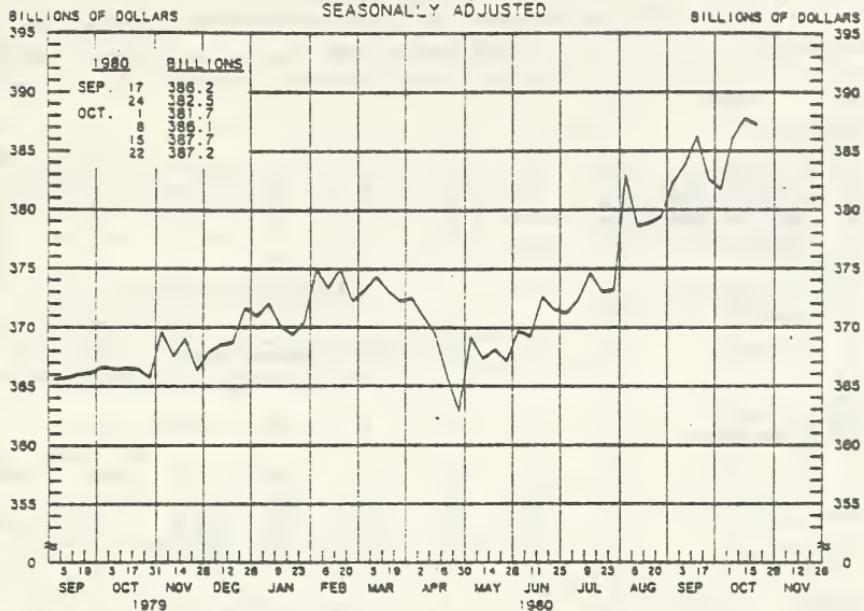
Our forecasts assume that the Federal Reserve System will slow monetary growth for the rest of this year to come close to meeting their targets for the year as a whole. With the demand for credit remaining at high levels due to the recovery of the real sectors of the economy, slowing monetary growth rates will increase interest rates. This process has already started, with the prime interest rate moving to 15.5 percent on November 6, 1980. We expect this rise in interest rates to be short lived, with the peak coming sometime before the end of this year. If the FRS follows a policy of moderate growth in the money supply through next year, interest rates will slowly decline through 1981. The first reaction to the high interest rates of the next few months will be to slow economic growth and decrease the demand for credit. Given the fiscal stimulus forecast for 1981, this slowdown should be moderate with the demand for credit increasing again in the first half of the year. However, interest rates would not necessarily have to increase at that time. Proof of a consistent policy of decreasing the growth in the money supply could reduce inflationary expectations. Currently, inflationary expectations account for about 80 percent of the level of nominal interest rates. The belief that inflation will decline can easily create declines in nominal interest rates even when—and perhaps especially when—real interest rates are increasing.

The extent of the decline in agricultural interest rates is very difficult to predict. Our point estimates of these rates are therefore extremely tenuous at this time. Yet we expect interest rates on non-real-estate debt to average about 20 percent lower in 1981. The average interest rate on outstanding real estate debt is forecast to be about 5 percent less than that for 1980. Note that the declines forecast here are for average interest rates on debt outstanding. Interest rates on new loans are expected to decrease substantially more than the rates discussed, particularly for real estate debt.

Projections of the balance sheet

Table 1 presents the balance sheet of the farming sector for January 1, 1978 to 1980 and our projections for 1981 and 1982. Increases in real estate values dominate the asset side of the account. Lower farm incomes and high interest rates have slowed the gains in the value of real estate assets through 1980. Our current estimates show the annual change in real estate values to lie between 7 to 12 percent for 1980, which represents a decrease in the value of the assets measured in constant dollars. Increased farm income expectations and projected lower interest rates should again make appreciation in real estate occur faster than the rate of inflation. We currently project the annual rate of change in real estate values to be between 11 to 16 percent for 1981.

Figure 1. MONEY STOCK (M1A)
AVERAGES OF DAILY FIGURES
SEASONALLY ADJUSTED

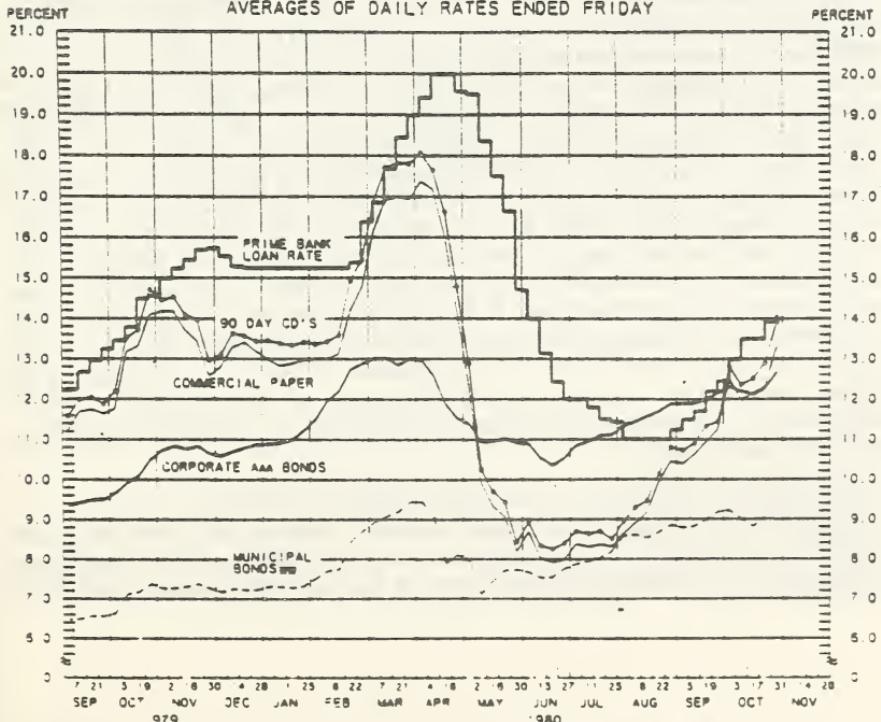


LATEST DATA PLOTTED WEEK ENDING: OCTOBER 22, 1980

CURRENT DATA APPEAR IN THE BOARD OF GOVERNORS' H.6 RELEASE.

M1A CONSISTS OF CURRENCY AND COIN PLUS COMMERCIAL BANK DEMAND DEPOSITS HELD BY THE NONBANK PUBLIC EXCLUDING THOSE HELD BY FOREIGN BANKS AND OFFICIAL INSTITUTIONS.

Figure 2. YIELDS ON SELECTED SECURITIES
AVERAGES OF DAILY RATES ENDED FRIDAY



LATEST DATA PLOTTED ARE AVERAGES OF RATES AVAILABLE FOR THE WEEK ENDING: OCTOBER 31, 1980

TABLE 1.—BALANCE SHEET OF THE FARMING SECTOR, 1978-82
[In billions of dollars]

Items/years (Jan. 1)	1978	1979	1980	1981 ¹	1982 ²	Percent change						
						1980-81	1981-82					
ASSETS												
Physical assets:												
Real estate.....	513.7	586.1	671.3	730.3	810.8	9	11					
Nonreal estate:												
Livestock and poultry.....	31.9	51.3	61.2	69.9	62.6	14	10					
Machinery and motor vehicles.....	77.1	85.1	94.3	98.0	120.4	4	23					
Crops stored on and off-farms.....	24.9	27.4	33.1	38.3	42.3	16	10					
Household equipment and furnishings.....	15.6	18.0	20.5	22.5	25.4	10	13					
Financial assets:												
Deposits and currency.....	15.2	15.5	15.9	16.2	16.4	2	1					
U.S. savings bonds and investments in cooperatives.....	19.2	21.0	22.6	24.1	29.4	7	22					
Total assets.....	697.6	804.4	918.9	999.3	1,107.3	9	11					
CLAIMS												
Liabilities:												
Real estate debt.....	63.7	70.8	82.1	96.1	108.3	17	13					
Nonreal estate debt to:												
CCC.....	4.5	5.2	4.5	4.7	3.0	4	-36					
Others.....	51.1	60.1	70.7	79.7	96.2	13	21					
Total liabilities.....	119.3	136.1	157.3	180.5	207.5	15	15					
Proprietors equities.....	578.3	668.3	761.6	818.8	899.8	8	10					
Total claims.....	697.6	804.4	918.9	999.3	1,107.3	9	11					

¹ Preliminary. ² Forecast.

The value of machinery and motor vehicles also shows the impacts of low incomes and high interest rates. Many farmers postponed purchases of capital equipment in 1980. But, with improving incomes and interest rates, 1981 will likely show a substantial increase in the value of these items.

Real estate debt is forecast to increase significantly in 1980. While the number of farmland transfers was probably low for the year, to farm real estate has been used as security for many types of what are usually nonmortgage loans. Refinancing operating loans by drought-stricken farmers has likely comprised much of the increase in real estate debt. Long-term interest rates were lower than short-term rates this spring, encouraging many farmers to borrow against their land to get operating credit. These actions also show up in the increase in non-real-estate debt, which was not as great as had been anticipated.

The growth in real estate debt may slow in 1981, since farmers will find operating loans more readily available. However, if there are more land transfers in 1981 and real estate values increase by more than the 11 percent incorporated into the table, real estate debt may grow as rapidly as it did this year. A resurgence of capital purchases and higher production expenses virtually assures an increase in non-real-estate debt. The projected increase for 1981 shows it almost doubling its 1980 growth rate.

Projections of the cash sources and uses of funds account

Table 2 presents our forecasts of the cash sources and uses of funds (CSUF) account for the farming sector. The CSUF account combines the forecasts of income with changes in balance sheet assets and debt

to provide a comprehensive picture of the economic welfare of the owners of farm assets.

TABLE 2.—CASH SOURCES AND USES OF FUNDS IN THE FARM SECTOR, 1979-81

[Dollar amounts in billions]

	1978	1980 ¹	1981 ²
Cash sources of funds:			
Net cash income from farm and nonfarm sources.....	\$87.5	\$87.0	\$96.7
Net flow of real estate loans.....	11.3	14.0	12.1
Net flow of nonreal estate loans.....	10.7	9.0	16.5
Total cash sources of funds.....	109.5	110.0	125.3
Cash uses of funds:			
Purchases of machinery and motor vehicles.....	10.5	7.3	19.4
Capital improvement to real estate assets.....	5.6	3.9	11.5
Other capital purchases.....	5.5	0.5	9.6
Annual capital formation.....	21.6	11.7	40.5
Purchases of real estate from discontinuing proprietors.....	13.2	13.2	16.1
Total purchased capital.....	34.8	24.9	56.6
Personal consumption and other cash uses.....	74.7	85.1	68.7
Total cash uses of funds.....	109.5	110.0	125.3
Total purchased capital.....	34.8	24.9	56.6
Change in inventories.....	4.1	-1.3	1.6
Total capital flow.....	38.9	23.6	58.2
Real dollar flows:			
Total net cash income/CPI.....	40.2	35.3	35.8
Personal consumption and other cash uses/CPI.....	34.4	34.5	25.4
Analytical ratios (percent):			
Total purchased capital/total net cash income.....	39.8	28.7	58.5
Total net flow of loans/total purchased capital.....	63.2	92.5	50.6
Total net flow of loans/total capital flow.....	56.6	97.5	49.2
Net flow of real estate loans/total cash uses.....	10.3	12.8	9.7
Cash income/total cash uses.....	79.9	79.0	77.2
End of year debt outstanding/total cash income.....	179.8	207.6	214.5

¹ Preliminary. ² Forecast.

Projected increases in off-farm income are expected to almost exactly offset the decline in cash income from farming in 1980. And, the sum of the net increases in real estate and non-real-estate debt is likely to be about the same in 1980 as in 1979. Thus, cash sources are marginally higher in 1980. Presenting these numbers in current dollars masks a substantial decline in the goods that can be purchased with the projected cash flows. The consumer price index (CPI), one measure of inflation, is expected to show a 13.3-percent increase through 1980. Deflated cash sources for 1980 would then show about an 11-percent decline when compared with 1979. Cash sources are forecast to increase by 14 percent in 1981, well above the expected inflation rate of about 10 percent. However, most of these real gains in cash flow will likely come from increases in debt. Cash incomes are projected to be up by only 11 percent while net changes in debt will likely increase by 24 percent.

In nominal terms, the slight decrease in cash sources of funds was more than offset by decreases in purchases of capital items in 1980. However, in constant dollars the funds available to sector participants for consumption and other cash uses declined slightly. Purchases of machinery and motor vehicles are expected to be off by 30 percent this year. But in 1981, these purchases will more than double from the depressed levels of 1980. All other types of capital purchases are expected

to follow much the same pattern as is expected for machinery and motor vehicles. The value of purchases of real estate from discontinuing proprietors is forecast to be constant in 1980 with a decrease in the land transfer rate being offset by increases in land values. More funds will likely be needed to make these purchases in 1981 when there will be more land transfers and real estate values will increase even more rapidly.

SUMMARY AND CONCLUSIONS

The year 1980 has been a difficult year for many farmers. Both farm incomes and appreciation in real estate values are lower in 1980 than they have been since 1977. The impacts of these declines have varied widely. The credit availability problems of this spring were concentrated in a few States. And the drought, while covering a large geographic area, did not strike all farmers.

A repetition of this spring's financial crisis is extremely unlikely in 1981, given improved income prospects and anticipated decreases in interest rates. Commercial banks' loan-to-deposit ratios have been declining throughout the summer in contradiction of past seasonal and long-term trends. Part of the explanation for this reversal is that banks can now be more competitive for funds with more freedom to set interest rates on deposits. Loan demand constrained by historically high interest rates also contributed to the decline in agricultural banks' loan-to-deposit ratios. Given improved liquidity of agricultural banks, farm operating loans should be readily available in 1981.

The summer drought dichotomized farmers. Livestock producers suffered not only from an adverse impact on their own production, but also from increases in feed costs. Crop producers were broken in two groups, the haves and the have-nots. Those farmers who have a crop to sell have been positively affected by increased prices. Those who have not been able to save their crops are in trouble. Government disaster relief programs will help, but will not completely offset the losses of the have-not farmers.

Farmers as a whole are likely to be substantially better off financially by the end of 1981. Incomes of most crop and livestock farmers are expected to be higher in 1981. Real estate values will likely increase by even more than the inflation rate, causing equity to grow. And finally, it is extremely unlikely that the combination of events that created local credit shortages in 1980 will reoccur in 1981.

SELECTED ASPECTS OF FARM SECTOR FINANCIAL EXPERIENCE AND OUTLOOK

(By Emanuel Melichar, Senior Economist, Board of Governors, Federal Reserve System)

These remarks cover three areas: (1) farm sector profitability and its implications for the sector's financial condition, which continues to be widely misunderstood; (2) liquidity conditions and farm lending experience at agricultural banks; and (3) farm loan interest rates.¹

I. FARM SECTOR PROFITABILITY

One often hears that farm real estate is selling at prices not justified by its income, implying that farm asset values have shaky, speculative underpinnings; or, that the ratio of farm debt to net farm income has risen greatly, implying that the ability to service and repay debt may be increasingly in jeopardy. If true, these considerations would dominate the farm financial outlook; thus, it is relevant to assess their validity in this session.

In each of these statements, the same serious analytical error has been committed: the farm income stream being compared with assets, debt, or marketings is the USDA's net farm income series, which represents income to farm operators' labor and management as well as income to farm capital. When such income is used in these comparisons, the financial condition of the farm sector appears to have deteriorated severely over the past 25 years. This is a false result, for the following reason.

Over time, there has been substantial substitution of capital for labor in farm production. Thus, with each passing year more of the USDA's net farm income represented a return to capital and less of it represented a return to labor. The change has been striking: USDA estimates indicate that whereas only about 30 percent of total returns to farming could be considered a return to capital in the midfifties, by the late seventies that proportion has risen to over 70 percent. Consequently, the return to farm production assets has risen rapidly—in constant dollars, by an annual average of 4.2 percent over 1954–79 (upper panel of chart 1). This series—which is akin to corporate business profits in that it is what remains after labor and management are paid going wage rates and management fees—represents the relevant data for comparisons with asset and debt levels.

In chart 1, this return-to-assets series is compared with asset values. Other things equal, asset values should rise at about the same pace as the growth in the return they are producing. This has been true of

¹ The analyses and conclusions are those of the author and do not necessarily reflect the views of the Board of Governors or of other members of its staff.

farm assets. For some years, farm assets have on average remained priced at about 25 times their growing return, with that annual return thus averaging about 4 percent of asset values (lower panel of chart 1).

Financial theory indicates that this price/earnings multiple was appropriate for farm assets if the return to these assets was expected to keep growing at an annual rate of about 4 percent and if owners of these assets were seeking a total real annual yield of about 8 percent (this being the actual average total yield). If these are reasonable assumptions about the expectations and goals of owners and buyers of farm assets, then farm assets have not been overpriced.²

In similar fashion, chart 2 shows that the return to assets has, over the past 25 years, kept pace with rising farm debt. Since 1954, the ratio of outstanding debt to the annual return to assets has fluctuated around a value of 4 (lower panel of chart 2).³

II. BANK LIQUIDITY AND FARM LENDING

Time and savings deposits at agricultural banks continued to rise in late 1979 and in each of the first three quarters of 1980, even when money-market interest rates were soaring. Steady gains were experienced by banks in each of the major farming areas (table 1).

By late April, however, it became evident that loans at agricultural banks were not increasing as they normally do in the spring. Significantly, this experience occurred not only in States in which the liquidity positions of agricultural banks had deteriorated since the spring of 1979, but also in the many regions in which agricultural banks were as liquid as, or more liquid than, they had been a year earlier (table 2). Thus, factors dampening loan demand generally—high interest rates and business recession—appear to have been primarily responsible for lack of growth in bank loans.

Consequently, the average loan/deposit ratio at agricultural banks fell sharply during the second and third quarters, when it normally exhibits a strong seasonal increase (chart 3). Improvements in average rural-bank liquidity were especially marked in the Lake States, Corn Belt, and Northern Plains (table 3). By mid-October, the national

² Owners of farm assets have thus been receiving about half of their total real return in the form of current income and half in the form of real capital gains. This puts farmland buyers who need high current income, such as beginning farmers, at a disadvantage vis-a-vis buyers who prefer or are content with accumulating capital gains. The many persons and groups who are currently seeking to increase the "profitability" of farm assets—meaning the rate of return in the form of current income—must first understand that this can only be accomplished by increasing the proportion of current income in the total return mix. That, in turn, can only be accomplished by reducing the growth rate of the current return.

This analysis thus has paradoxical policy implications, in that the policies that such persons and groups should advocate are often not the ones they now tend to put forth. But the essence of the analysis is very simple: the "profitability" of farming in terms of the rate of current income to assets can only increase if those assets are priced at a lower multiple of that income. The key to understanding and appropriate policy formulation lies in next realizing that the present high multiple is a logical consequence of the growth record of the current income; hence the importance of the common analytical error that has obscured that record.

³ Analysts have also expressed concern that a marked decline in the ratio of net income to gross income—the "profit" margin—indicates that the financial vulnerability of the farm sector has increased. Again, however, that "profit" margin includes operators' labor and management earnings. The return to assets alone has not shown a secular decline relative to farm cash receipts or gross income. Thus for farm groups for which most labor inputs are fixed cash outlays (such as very large or corporate farms), profit margins and financial vulnerability may have not changed significantly. They have probably moved adversely on farms (such as tenant-operated farms) on which labor earnings comprise a large proportion of operators' net income.

average loan/deposit ratio at agricultural banks had dropped to 60 percent; however, this was still significantly above the level of 55 percent that had prevailed for 7 years prior to 1976 (table 4).

Agricultural banks in States at the western end of the Corn Belt—Iowa, Nebraska, Minnesota, and the Dakotas—had entered 1980 with relatively high loan/deposit ratios. The average liquidity position of agricultural banks has improved considerably in each of these States (table 4).

The volume of non-real-estate farm loans outstanding at commercial banks did not increase during the first half of 1980; the last time this happened was in 1942. In the third quarter, however, these loans rose by about \$500,000,000, or 1.7 percent, to a total of \$31.6 billion. When compared with the experience of earlier years, the most striking reductions in farm loans at banks occurred in the Midwest and Plains States—Federal Reserve Districts 7, 9, and 10 (table 5). In many other States, farm loan growth at banks was maintained within the range of recent experience.

III. FARM LOAN INTEREST RATES AT BANKS

For the first time, farm loan interest rates at rural banks rose sharply during a cyclical upswing in money-market rates and in the prime rate at large banks (chart 4).

It is not likely that the higher opportunity cost of making farm loans during this period was a major factor in the rural rate increases, because, as chart 4 indicates, rural banks had not raised farm loan rates much when similar opportunity cost increases occurred in earlier cycles.

Rural banks raised loan rates sharply in this cycle because, for the first time, their cost of loanable funds increased greatly as money-market rates soared. But this did not happen because they were raising more funds through money-market instruments such as Federal funds or large certificates of deposit; they were not doing so (first two panels of table 6). Rather, their cost rose because their local depositors rapidly shifted a large proportion of their deposits into the "money-market" certificates (deposits of \$10,000 or more with minimum maturity of 6 months and rate ceilings tied to recent U.S. Treasury bill yields) that had been introduced in 1978 (last panel of table 6).

During future periods of monetary restraint, farm loan rates at rural banks are thus likely to move with money-market rates, as they have done since mid-1979 (chart 5). It remains to be seen, however, how the depositors, and thus the loan rates, of rural banks will behave during periods of more normal monetary conditions, when short-term money-market rates represent the low end of the interest rate spectrum.

Timely information on average farm loan rates typically being charged by rural banks is provided by the quarterly Federal Reserve bank surveys of farm credit conditions. More detail on terms of farm loans at all banks is provided by a quarterly Federal Reserve survey of terms of a sample of individual loans made during the first week of February, May, August, and November (chart 5, tables 7 and 8). Results are published about 7 weeks later in Statistical Release E.2, available from Publications Services, Federal Reserve Board, Washington, D.C. 20551. A mailing list is maintained.

TABLE 1.—ESTIMATES FOR LOAN-DEPOSIT PROJECTION PROJECT, E. MELICHAR, NOV. 17, 1980:
AGRICULTURAL INSURED COMMERCIAL BANKS;¹ TIME AND SAVINGS DEPOSITS

[Percentage change from Jan. 2, 1980 to date shown]

Date	Farm production areas									
	North- east States	Lake States	Corn Belt	North- ern Plains	Appa- lachian States	South- east States	Delta States	South- ern Plains	Mountain States	Pacific States
	(10)	(20)	(25)	(25)	(15)	(15)	(15)	(25)	(15)	(15)
Jan. 9, 1980	0	1	1	1	1	1	2	1	1	0
Jan. 16, 1980	1	1	1	2	1	1	2	2	1	0
Jan. 23, 1980	1	1	1	2	2	2	3	2	1	0
Jan. 30, 1980	1	1	2	3	2	2	3	3	2	1
Feb. 6, 1980	2	2	2	3	2	2	3	4	2	1
Feb. 13, 1980	2	2	2	3	2	2	4	4	2	1
Feb. 20, 1980	2	2	2	3	2	3	4	4	2	2
Feb. 27, 1980	2	2	2	4	3	3	4	5	3	2
Mar. 5, 1980	2	3	3	4	3	4	5	6	3	3
Mar. 12, 1980	3	3	3	4	3	4	5	6	3	3
Mar. 19, 1980	2	3	4	5	4	5	6	7	3	3
Mar. 26, 1980	2	3	4	5	4	5	6	7	3	3
Apr. 2, 1980	3	4	5	5	4	6	7	8	4	4
Apr. 9, 1980	3	4	6	6	5	6	7	9	4	4
Apr. 16, 1980	3	4	6	6	5	6	7	9	3	4
Apr. 23, 1980	3	4	6	6	5	7	7	9	4	4
Apr. 30, 1980	4	4	6	6	5	7	7	9	4	4
May 7, 1980	4	5	6	7	5	7	7	9	4	4
May 14, 1980	4	5	6	7	5	7	7	9	4	4
May 21, 1980	5	5	7	7	6	7	7	9	4	5
May 28, 1980	5	5	7	8	6	7	7	10	5	5
June 4, 1980	6	6	7	8	6	7	8	10	5	5
June 11, 1980	6	6	7	8	6	8	8	10	5	5
June 18, 1980	6	6	7	8	5	8	8	10	5	4
June 25, 1980	6	6	7	8	5	8	8	10	5	4
July 2, 1980	6	6	7	9	6	9	9	10	5	5
July 9, 1980	7	6	8	9	6	9	9	11	5	5
July 16, 1980	7	7	8	9	6	9	9	11	5	5
July 23, 1980	7	8	8	9	6	9	10	11	6	6
July 30, 1980	7	8	8	9	6	8	10	11	6	6
Aug. 6, 1980	7	8	9	10	6	8	10	11	6	6
Aug. 13, 1980	7	8	9	10	7	8	11	12	6	6
Aug. 20, 1980	8	9	9	10	7	8	11	12	7	6
Aug. 27, 1980	8	9	9	10	7	8	11	12	7	6
Sept. 3, 1980	8	9	9	10	7	9	11	13	7	7
Sept. 10, 1980	8	9	10	11	7	9	12	13	7	7
Sept. 17, 1980	8	9	10	11	8	9	11	13	7	7
Sept. 24, 1980	8	9	11	11	8	9	12	14	8	8
Oct. 1, 1980	9	9	11	11	8	9	11	13	7	8
Oct. 8, 1980	10	11	12	11	8	9	12	15	8	9
Oct. 15, 1980	10	10	13	11	9	10	13	15	8	9
Oct. 22, 1980	10	11	13	12	9	10	13	15	9	10

¹ Banks at which farm loans represent at least the percentage of total loans shown in the column headings.

TABLE 2.—ESTIMATES FROM LOAN-DEPOSIT PROJECTION PROJECT, E. MELICHAR, NOV. 17, 1980: AGRICULTURAL INSURED COMMERCIAL BANKS,¹ TOTAL LOANS

[Percentage change from Jan. 2, 1980 to date shown]

Date	Farm production areas									
	North-east States	Lake States	Corn Belt	North- ern Plains	Appa- lachian States	South- east States	Delta States	South- ern Plains	Mount- ain States	Pacific States
	(10)	(20)	(25)	(25)	(15)	(15)	(15)	(25)	(15)	(15)
Jan. 9, 1980.....	0	0	0	0	0	0	-1	-1	0	0
Jan. 16, 1980.....	0	0	0	0	0	0	-1	-1	0	0
Jan. 23, 1980.....	0	0	-1	0	0	0	-1	-1	0	0
Jan. 30, 1980.....	0	0	-1	-1	0	0	0	-1	0	1
Feb. 6, 1980.....	0	0	-1	-1	0	0	0	-1	0	1
Feb. 13, 1980.....	0	0	-1	-1	0	0	0	-1	0	1
Feb. 20, 1980.....	0	0	-1	-1	0	0	0	-1	0	1
Feb. 27, 1980.....	0	0	-1	-1	0	0	0	0	0	1
Mar. 5, 1980.....	0	0	0	0	0	1	0	0	0	1
Mar. 12, 1980.....	0	1	0	0	0	1	1	0	0	2
Mar. 19, 1980.....	0	0	0	0	0	1	1	0	0	2
Mar. 26, 1980.....	0	0	0	0	0	0	1	1	0	2
Apr. 2, 1980.....	0	0	0	0	0	1	1	1	0	2
Apr. 9, 1980.....	0	0	-1	-1	-1	0	1	1	0	2
Apr. 16, 1980.....	0	0	-1	-1	0	0	2	1	0	2
Apr. 23, 1980.....	0	0	-1	-1	-1	0	2	1	0	2
Apr. 30, 1980.....	0	0	-1	-1	-1	0	2	1	0	2
May 7, 1980.....	0	0	-2	-1	-1	-1	2	1	0	2
May 14, 1980.....	0	0	-2	-1	-1	-1	2	1	0	2
May 21, 1980.....	0	-1	-2	-2	-1	-1	1	1	0	2
May 28, 1980.....	0	0	-2	-2	-1	-1	1	1	0	2
June 4, 1980.....	-1	0	-2	-2	-1	-1	1	1	0	2
June 11, 1980.....	-1	0	-2	-2	-1	-1	1	1	0	2
June 18, 1980.....	-1	0	-2	-2	-1	-1	1	1	1	2
June 25, 1980.....	-1	-1	-2	-2	-1	-1	1	2	1	3
July 2, 1980.....	-1	0	-2	-1	-1	-1	1	2	1	2
July 9, 1980.....	-1	0	-2	-1	-1	-1	1	2	1	2
July 16, 1980.....	-1	-1	-3	-2	-2	0	1	2	1	2
July 23, 1980.....	-1	-1	-3	-2	-2	0	0	2	1	2
July 30, 1980.....	-1	-1	-3	-2	-1	0	1	2	1	2
Aug. 6, 1980.....	-1	-1	-3	-2	-2	0	1	2	1	2
Aug. 13, 1980.....	-1	-1	-3	-2	-1	0	2	3	1	2
Aug. 20, 1980.....	0	-1	-3	-2	-1	0	2	3	1	2
Aug. 27, 1980.....	0	-1	-3	-2	-1	1	2	3	2	3
Sept. 3, 1980.....	0	-1	-3	-2	-1	1	3	3	2	3
Sept. 10, 1980.....	0	-1	-3	-2	-1	1	2	3	2	3
Sept. 17, 1980.....	0	-1	-3	-2	-1	1	3	4	2	3
Sept. 24, 1980.....	0	-1	-3	-2	-1	1	3	4	2	3
Oct. 1, 1980.....	0	-1	-2	-2	-1	1	3	4	2	4
Oct. 8, 1980.....	1	-1	-2	-2	0	1	4	5	2	3
Oct. 15, 1980.....	1	-1	-2	-2	0	2	4	5	2	3
Oct. 22, 1980.....	1	-1	-3	-2	0	2	4	5	2	3

¹ Banks at which farm loans represent at least the percentage of total loans shown in the column headings.

TABLE 3.—ESTIMATES FROM LOAN-DEPOSIT PROJECTION PROJECT, E. MELICHAR, NOV 17, 1980: AGRICULTURAL INSURED COMMERCIAL BANKS,¹ LOAN/DEPOSIT RATIO (PERCENT)

[Percentage change from Jan. 2, 1980 to date shown]

Date	Farm production areas									
	North-east States	Lake States	Corn Belt	North- ern Plains	Appa- lachian States	South- east States	Delta States	South- ern Plains	Mount- ain States	Pacific States
	(10)	(20)	(25)	(25)	(15)	(15)	(15)	(25)	(15)	(15)
Jan. 2, 1980.....	73	69	65	66	65	64	60	55	67	70
Jan. 9, 1980.....	73	70	65	67	65	63	59	55	67	70
Jan. 16, 1980.....	73	71	66	67	66	64	59	55	68	71
Jan. 23, 1980.....	74	71	66	68	66	65	60	55	69	72
Jan. 30, 1980.....	74	72	66	68	67	66	61	55	69	73
Feb. 6, 1980.....	73	71	66	67	66	64	60	54	69	71
Feb. 13, 1980.....	73	71	66	67	66	64	60	55	69	72
Feb. 20, 1980.....	73	70	65	66	66	64	60	54	68	72
Feb. 27, 1980.....	74	70	66	67	67	65	61	55	69	73
Mar. 5, 1980.....	73	70	65	66	65	63	59	54	68	71
Mar. 12, 1980.....	73	71	66	67	66	63	60	55	68	71
Mar. 19, 1980.....	74	71	66	68	66	63	61	56	69	72
Mar. 26, 1980.....	74	71	66	68	66	64	61	56	70	73
Apr. 2, 1980.....	73	70	65	67	66	62	60	55	69	71
Apr. 9, 1980.....	72	70	65	67	65	62	60	55	68	70
Apr. 16, 1980.....	72	70	64	67	65	62	60	55	68	71
Apr. 23, 1980.....	73	70	65	67	66	63	61	56	69	72
Apr. 30, 1980.....	72	71	65	67	66	63	61	56	69	72
May 7, 1980.....	72	70	64	66	65	62	60	55	68	72
May 14, 1980.....	72	70	64	66	65	62	61	56	69	72
May 21, 1980.....	72	70	64	66	66	63	61	56	69	72
May 28, 1980.....	71	69	64	65	65	62	61	56	69	73
June 4, 1980.....	71	69	63	65	65	62	60	55	68	71
June 11, 1980.....	71	69	63	65	65	61	60	55	68	71
June 18, 1980.....	71	69	64	65	65	62	60	56	69	72
June 25, 1980.....	71	69	64	65	66	63	60	56	70	73
July 2, 1980.....	70	69	63	65	65	62	59	55	68	71
July 9, 1980.....	69	68	62	64	64	61	58	55	68	70
July 16, 1980.....	70	67	62	64	64	62	59	55	68	71
July 23, 1980.....	70	68	63	65	65	62	59	56	69	71
July 30, 1980.....	70	68	62	65	65	63	59	55	69	71
Aug. 6, 1980.....	69	67	61	64	64	62	59	55	68	70
Aug. 13, 1980.....	69	66	62	63	64	62	59	55	68	70
Aug. 20, 1980.....	70	66	62	64	64	63	60	55	68	70
Aug. 27, 1980.....	70	66	62	64	65	63	60	55	68	71
Sept. 3, 1980.....	68	66	60	62	63	61	59	54	67	69
Sept. 10, 1980.....	69	66	61	63	64	62	59	54	67	68
Sept. 17, 1980.....	69	66	61	63	64	62	60	55	67	69
Sept. 24, 1980.....	70	66	61	64	64	63	61	56	68	70
Oct. 1, 1980.....	68	66	60	63	64	62	60	55	67	69
Oct. 8, 1980.....	68	65	60	63	63	61	59	54	66	68
Oct. 15, 1980.....	68	64	59	62	63	61	59	54	65	67
Oct. 22, 1980.....	69	65	59	63	64	62	59	55	66	68

¹ Banks at which farm loans represent at least the percentage of total loans shown in the column headings.

TABLE 4.—ESTIMATES FROM LOAN-DEPOSIT PROJECTION PROJECT, E. MELICHAR, NOV. 17, 1980: AGRICULTURAL INSURED COMMERCIAL BANKS,¹ LOAN/DEPOSIT RATIO (PERCENT)—
Continued

Date	United States	Corn Belt				Lake States				Plains				Mountain States					
		OH	IN	IL	IO	MO	MI	WI	MN	ND	SD	NB	KS	OK	TX	NM	CO	WY	MT
Dec. 31, 1969	53	54	50	48	56	59	56	63	54	52	55	56	52	51	52	57	62	53	53
June 30, 1970	57	58	53	49	58	51	62	54	54	57	53	55	52	51	52	56	66	61	60
Dec. 31, 1970	54	55	51	48	59	54	63	55	57	56	61	59	52	51	51	58	62	58	53
June 30, 1971	55	57	53	50	47	58	48	63	55	54	49	56	50	53	53	61	63	63	60
Dec. 31, 1971	53	55	50	47	58	54	63	55	55	54	56	55	52	51	51	58	60	61	51
June 30, 1972	56	57	50	48	59	53	65	58	57	55	60	62	54	51	54	64	65	62	58
Dec. 31, 1972	53	54	50	45	56	50	64	56	57	52	48	56	59	52	53	62	60	60	50
June 30, 1973	56	56	51	45	57	54	66	59	55	52	59	65	55	53	56	66	64	64	56
Dec. 31, 1973	54	56	50	46	57	52	66	58	53	49	59	60	52	54	51	65	59	59	55
June 30, 1974	57	60	52	48	57	57	68	60	54	50	60	54	54	51	51	69	65	65	60
Dec. 31, 1974	55	55	53	49	55	53	66	62	55	54	59	57	53	54	53	65	60	59	59
June 30, 1975	56	56	50	49	56	55	66	60	57	54	59	58	55	52	52	65	62	63	61
Dec. 31, 1975	56	58	54	50	57	52	66	60	58	57	60	59	56	54	54	61	63	59	58
June 30, 1976	59	62	56	52	60	56	67	62	62	61	60	64	60	56	57	64	68	66	62
Dec. 31, 1976	56	60	50	54	62	56	68	62	60	62	66	62	62	57	54	64	69	63	63
June 30, 1977	64	66	61	57	66	61	66	71	64	65	67	72	64	58	59	64	71	66	65
Dec. 31, 1977	62	65	59	61	66	62	66	68	68	66	60	65	66	67	65	59	62	68	61
June 30, 1978	64	68	64	61	66	62	70	70	65	67	66	64	64	61	60	63	72	63	65
Dec. 31, 1978	64	67	65	64	67	62	71	70	65	61	68	65	64	61	60	64	71	62	62
June 30, 1979	67	69	67	64	69	66	72	70	68	69	63	69	65	60	59	63	76	71	70
Jan. 2, 1980	64	66	65	61	68	63	70	69	64	69	69	69	67	62	57	53	61	71	64
Jan. 9, 1980	65	66	65	61	69	65	69	70	71	65	70	70	71	66	58	52	60	73	66
Jan. 16, 1980	65	67	65	61	69	65	70	70	72	65	71	63	63	59	53	60	72	63	64
Jan. 23, 1980	66	68	66	61	70	66	71	70	72	67	72	71	64	59	53	60	75	65	66
Jan. 30, 1980	66	68	66	62	70	66	71	71	73	67	72	71	64	59	53	61	74	66	66
Feb. 6, 1980	65	67	65	61	69	65	70	70	70	66	71	66	62	58	52	60	73	65	65
Feb. 13, 1980	65	67	65	61	69	65	69	65	65	69	69	69	67	63	58	53	60	74	66
Feb. 20, 1980	64	66	65	60	68	64	68	64	64	69	71	66	70	69	58	52	60	74	66
Feb. 27, 1980	65	67	66	61	70	66	69	69	69	71	66	71	66	70	69	63	59	61	66
Mar. 5, 1980	64	66	65	60	68	64	69	68	68	69	70	65	70	69	62	58	60	72	65
Mar. 12, 1980	65	67	65	61	70	66	69	67	66	69	72	65	70	69	59	53	60	73	66
Mar. 19, 1980	65	67	65	61	70	66	69	67	66	69	70	66	71	66	59	54	61	74	66
Mar. 26, 1980	66	67	65	61	70	66	69	67	66	69	70	67	71	64	59	54	61	75	67
Apr. 2, 1980	65	66	64	60	68	65	69	66	66	69	70	66	71	71	58	53	59	73	66

See footnote at end of table.

TABLE 4.—ESTIMATES FROM LOAN-DEPOSIT PROJECTION PROJECT, E. MELICHAR, NOV. 17, 1980: AGRICULTURAL INSURED COMMERCIAL BANKS;¹ LOAN/DEPOSIT RATIO (PERCENT)

Date	United States				Corn Belt				Lake States				Plains				Mountain States			
	OH	IN	IL	IO	MO	MI	WI	MN	ND	SD	NB	KS	OK	TX	NM	CO	WY	MT		
Apr. 9, 1980	64	66	64	60	68	64	68	69	71	70	63	63	58	53	59	73	66	65		
Apr. 16, 1980	64	66	64	60	68	65	69	70	71	66	70	63	58	53	59	73	66	66		
Apr. 23, 1980	65	66	64	60	68	65	68	70	71	65	69	63	58	55	60	74	66	66		
Apr. 30, 1980	65	66	64	60	68	65	68	70	70	65	69	63	58	54	60	74	66	66		
May 7, 1980	64	66	64	60	67	64	67	64	70	65	65	63	58	54	60	74	65	65		
May 14, 1980	64	66	64	60	67	64	68	70	70	65	68	63	58	55	60	74	65	65		
May 21, 1980	64	66	64	60	67	64	68	69	70	65	68	63	58	56	60	75	64	65		
May 28, 1980	64	65	64	60	67	64	68	69	69	64	67	68	62	57	55	60	74	65	65	
June 4, 1980	63	65	63	59	66	63	66	68	69	64	67	68	62	57	54	59	74	64	64	
June 11, 1980	63	65	63	59	66	63	67	69	69	63	66	68	62	57	54	60	74	64	64	
June 18, 1980	64	65	63	59	66	63	67	69	69	64	67	69	62	57	55	60	75	64	65	
June 25, 1980	64	66	64	59	66	64	68	69	69	64	67	69	62	58	56	61	76	65	65	
July 2, 1980	63	66	62	59	66	63	67	69	69	64	67	68	61	56	55	60	74	64	65	
July 9, 1980	63	65	62	58	65	62	62	67	68	63	66	68	60	56	54	59	74	64	64	
July 16, 1980	63	65	62	58	65	62	62	67	68	63	66	68	60	55	55	59	74	64	64	
July 23, 1980	63	65	63	58	65	62	67	68	67	64	67	68	60	56	55	60	75	64	65	
July 30, 1980	63	65	63	58	65	62	68	69	67	64	67	68	60	56	55	59	74	65	65	
Aug. 6, 1980	62	64	63	57	64	61	66	68	66	63	66	67	67	59	55	59	73	65	64	
Aug. 13, 1980	62	64	63	57	64	61	66	68	65	63	65	67	59	55	55	59	73	65	64	
Aug. 20, 1980	62	64	63	58	64	61	67	66	67	63	66	68	59	55	56	59	74	64	65	
Aug. 27, 1980	62	64	63	57	64	61	67	67	67	63	65	68	59	55	56	59	74	64	65	
Sept. 3, 1980	62	65	63	56	63	60	66	66	67	65	65	66	58	54	54	58	72	64	64	
Sept. 10, 1980	61	63	63	57	63	60	66	67	64	62	65	67	59	55	59	73	63	63	63	
Sept. 17, 1980	62	64	63	57	63	60	66	67	65	61	64	67	59	54	55	74	62	64	64	
Sept. 24, 1980	62	64	63	57	63	60	67	67	67	62	65	68	60	55	56	60	74	62	64	
Oct. 1, 1980	61	63	63	57	62	60	66	67	65	62	64	67	59	54	55	73	62	63	63	
Oct. 8, 1980	61	62	61	56	61	59	65	66	64	61	64	67	58	54	55	72	61	62	62	
Oct. 15, 1980	60	61	60	55	61	55	61	66	67	60	64	63	53	54	56	70	61	62	62	
Oct. 22, 1980	61	61	60	55	61	55	61	66	67	60	64	67	55	56	57	72	61	62	62	

¹ Banks at which farm loans represent 25 percent or more of total loans (15 percent in Michigan).

TABLE 5.—FARM NON-REAL-ESTATE LOANS OUTSTANDING AT INSURED COMMERCIAL BANKS

Federal Reserve District and State	Estimated amount, Sept. 30, 1980 (millions)	Percentage change in—									
		1st 3 quarters					Year ending Sept. 30				
		1976	1977	1978	1979	1980	1977	1978	1979	1980	
United States	\$31,598	14	13	9	9	2	15	7	10	3	
1—Boston	97	-11	-2	12	-3	-25	12	33	40	-8	
2—New York	673	-3	14	0	20	29	29	2	33	40	
New York	668	-4	14	0	20	29	29	2	34	40	
3—Philadelphia	306	-4	8	9	-1	-9	14	14	4	-2	
Pennsylvania ¹	294	-6	6	10	0	-6	12	16	6	0	
4—Cleveland	726	8	21	12	10	6	19	7	9	2	
Kentucky ¹	202	9	16	13	12	9	11	11	10	4	
Ohio	506	10	23	12	10	6	23	7	9	2	
Pennsylvania ¹	16	-25	21	-2	3	-11	11	-16	-4	-11	
5—Richmond	689	24	28	13	14	15	14	2	-1	4	
Maryland	64	11	12	1	-5	14	15	-2	-7	16	
North Carolina	308	47	34	20	19	22	13	5	-6	8	
South Carolina	87	26	35	5	15	15	28	-10	8	4	
Virginia	198	7	25	14	16	9	11	4	7	-4	
West Virginia ¹	33	-3	18	1	5	2	14	2	-3	-1	
6—Atlanta	1,299	15	25	5	12	9	21	-3	8	-1	
Alabama	288	26	33	2	21	12	23	-8	9	-5	
Florida	160	-2	1	-12	-3	-6	8	-5	14	-5	
Georgia	337	21	26	3	11	2	24	-11	12	-3	
Louisiana ¹	156	9	45	33	8	35	27	20	-3	10	
Mississippi ¹	155	20	30	11	32	27	20	-1	12	6	
Tennessee ¹	203	7	20	8	6	4	20	8	6	-1	
7—Chicago	6,759	10	14	7	7	-3	22	7	11	1	
Illinois ¹	1,585	8	14	9	2	-3	23	9	8	-2	
Indiana ¹	808	16	23	15	10	4	24	11	10	2	
Iowa	3,318	9	12	2	8	-6	23	4	16	1	
Michigan ¹	407	20	20	9	8	-2	18	3	3	-2	
Wisconsin ¹	641	9	14	13	9	5	17	13	7	4	
8—St. Louis	2,401	20	24	17	13	10	19	9	5	1	
Arkansas	450	32	45	28	12	24	20	8	-5	-1	
Illinois ¹	543	14	20	15	8	0	26	11	7	-3	
Indiana ¹	172	13	19	14	12	5	21	11	8	1	
Kentucky ¹	302	16	15	14	10	14	13	11	3	7	
Mississippi ¹	219	18	36	20	33	30	16	3	5	3	
Missouri ¹	572	16	10	10	12	4	16	9	12	3	
Tennessee ¹	144	31	44	19	26	19	17	1	5	-3	
9—Minneapolis	4,382	9	9	11	17	-2	12	10	18	0	
Michigan ¹	8	12	1	11	10	-18	2	8	15	-20	
Minnesota	1,868	8	14	16	17	-2	18	13	19	1	
Montana	537	18	4	8	18	6	2	7	11	-4	
North Dakota	746	11	4	9	23	-2	6	5	23	-3	
South Dakota	1,027	5	8	8	15	-6	13	11	20	0	
Wisconsin ¹	195	11	16	9	13	3	20	10	11	7	
10—Kansas City	6,973	16	8	5	6	-1	12	4	9	3	
Colorado	783	20	9	7	5	6	12	3	4	2	
Kansas	1,886	13	4	3	3	-5	10	6	8	2	
Missouri ¹	701	16	12	11	10	-2	14	12	12	4	
Nebraska	2,326	19	12	7	11	0	17	2	10	5	
New Mexico	43	5	12	17	14	-5	7	7	4	-13	
Oklahoma ¹	1,009	8	4	-2	1	-2	6	6	11	0	
Wyoming	225	23	2	0	12	6	-2	-4	5	-2	
11—Dallas	2,658	18	14	14	0	8	12	6	-1	5	
Louisiana ¹	171	46	54	33	22	42	22	2	-3	8	
New Mexico	141	18	9	9	1	5	4	0	-2	1	
Oklahoma ¹	53	22	18	10	-16	4	12	12	-17	3	
Texas	2,293	16	12	13	-2	6	12	7	0	5	
12—San Francisco	4,635	17	11	13	13	5	8	10	11	4	
Arizona	410	-9	23	14	12	0	5	16	21	1	
California	2,792	14	10	14	12	5	11	12	12	8	
Hawaii	15	-4	-12	-11	-22	24	32	10	-6	15	
Idaho	382	28	5	6	12	5	-5	-3	-1	-5	
Nevada	19	21	27	1	17	-2	13	24	-2	-19	
Oregon	329	33	9	13	10	18	5	11	5	14	
Utah	98	17	2	-1	-3	7	10	2	-3	-5	
Washington	590	38	19	17	23	1	11	11	12	-6	

¹ Portion of State in specified Federal Reserve District.

TABLE 6.—SELECTED SOURCES OF FUNDS AS A PERCENTAGE OF TOTAL BANKING RESOURCES

End of month	All banks	Agricultural banks	Nonagricultural banks with total assets—	
			Under \$500,000,000	\$500,000,000 and over
Net purchases of Federal funds:¹				
1978:				
March	3.9	-4.3	-1.4	8.5
June	3.9	-2.8	-7	7.7
September	4.2	-2.0	-8	8.3
December	3.4	-2.8	-1.1	6.8
1979:				
March	4.7	-2.5	-5	8.9
June	4.6	-2.3	-9	8.8
September	4.1	-2.6	-2.0	8.5
December	3.7	-3.6	-2.4	8.0
1980:				
March	3.7	-4.0	-2.1	7.9
June	4.1	-5.2	-2.7	9.2
Time certificates of deposit of \$100,000 or more:				
1978:				
March	12.8	4.7	9.5	16.1
June	13.0	4.8	9.4	16.3
September	13.4	5.0	9.8	16.7
December	14.0	5.1	10.1	17.3
1979:				
March	14.1	5.3	11.1	17.0
June	12.8	5.3	11.0	14.7
September	13.2	5.5	10.9	15.4
December	13.3	5.6	11.0	15.4
1980:				
March	13.7	6.0	11.5	15.8
June	13.1	6.1	11.0	15.0
Money-market certificates of deposit:²				
1979:				
March	3.3	5.7	4.7	2.1
June	4.5	8.5	6.5	2.8
September	5.7	11.4	8.4	3.5
December	7.6	14.9	11.2	4.7
1980:				
March	10.2	21.7	15.1	6.2
June	10.7	22.6	15.6	6.6

¹ Includes net securities sold under agreements to repurchase.² Does not include "small-saver" certificates with a minimum maturity of 30 mo, which were introduced in 1979.TABLE 7.—PERCENTAGE DISTRIBUTION OF NON-REAL-ESTATE FARM LOANS MADE BY BANKS, BY EFFECTIVE INTEREST RATE^{1,2}

Effective interest rate (percent)	Aug. 1977	Feb. 1978	Aug. 1978	Feb. 1979	Aug. 1979	Nov. 1979	Feb. 1980	May 1980	Aug. 1980
ALL BANKS									
All loans	100	100	100	100	100	100	100	100	100
Under 7	2								
7 to 7.9	11	1							
8 to 8.9	48	38	20	4	2				
9 to 9.9	34	50	50	17	11	1			
10 to 10.9	4	9	22	35	29	7	2		
11 to 11.9	1	6	19	33	10	2			10
12 to 12.9		1	12	14	15	7	1		17
13 to 13.9			6	7	35	29	4		43
14 to 14.9			6	5	13	31	9		19
15 to 15.9				1	4	10	7		9
16 to 16.9					6	10	12		1
17 to 17.9					5	4	34		
18 to 18.9					3	2	18		
19 to 19.9							9		
20 and over							6		

ADDENDUMAverage effective interest rate (percent)² at—

All banks	8.73	9.16	9.62	11.01	11.28	13.63	14.13	17.38	13.51
Large banks ³	8.40	9.32	10.37	12.53	12.88	16.24	15.94	18.47	12.84
Other banks	8.91	9.11	9.34	10.45	10.93	13.10	13.73	17.06	13.66

¹ Percentage distribution of the total dollar amount of non-real-estate farm loans of \$1,000 or more made by insured commercial banks during the week covered by the survey.² The approximate compounded annual interest rate on each loan is calculated from survey data on the stated rate and other terms of the loan. In computing the average of these estimated effective rates, each loan is weighted by its dollar amount.³ Large banks are banks in survey strata 1-3, corresponding approximately to banks with over \$400,000,000 in total assets as of September 1978.

Source: Federal Reserve quarterly survey of terms of bank lending to farmers.

TABLE 8.—PERCENTAGE DISTRIBUTION OF NON-REAL-ESTATE FARM LOANS MADE BY LARGE AND OTHER BANKS, BY EFFECTIVE INTEREST RATE^{1,2}

Effective interest rate (percent)	Aug. 1977	Feb. 1978	Aug. 1978	Feb. 1979	Aug. 1979	Nov. 1979	Feb. 1979	May 1980	Aug. 1980
LARGE BANKS³									
All loans.....									
Under 7.....	3	—	1	—	—	—	—	—	—
7 to 7.9.....	30	1	—	—	—	—	—	—	—
8 to 8.9.....	43	34	1	—	—	—	—	—	—
9 to 9.9.....	17	41	30	2	1	—	—	—	—
10 to 10.9.....	7	20	44	19	11	—	—	—	—
11 to 11.9.....	—	4	20	12	10	1	—	—	16
12 to 12.9.....	—	—	3	28	33	6	4	—	43
13 to 13.9.....	—	—	—	17	22	13	8	1	31
14 to 14.9.....	—	—	—	20	20	4	14	2	6
15 to 15.9.....	—	—	—	2	3	8	18	5	2
16 to 16.9.....	—	—	—	—	—	24	32	4	1
17 to 17.9.....	—	—	—	—	—	23	15	32	—
18 to 18.9.....	—	—	—	—	—	17	8	27	—
19 to 19.9.....	—	—	—	—	—	1	1	12	—
20 and over.....	—	—	—	—	—	—	—	17	—
OTHER BANKS									
All loans.....									
Under 7.....	1	—	—	—	—	—	—	—	—
7 to 7.9.....	1	—	—	—	—	—	—	—	—
8 to 8.9.....	51	38	27	5	2	—	2	—	—
9 to 9.9.....	43	56	58	23	13	1	1	—	—
10 to 10.9.....	3	5	13	41	33	9	3	—	1
11 to 11.9.....	—	1	22	38	12	3	—	—	8
12 to 12.9.....	—	—	1	6	10	16	8	1	11
13 to 13.9.....	—	—	—	2	3	39	33	4	45
14 to 14.9.....	—	—	—	1	1	15	35	11	23
15 to 15.9.....	—	—	—	2	3	3	8	7	10
16 to 16.9.....	—	—	—	—	—	2	5	14	1
17 to 17.9.....	—	—	—	—	—	2	2	35	1
18 to 18.9.....	—	—	—	—	—	1	—	8	—
19 to 19.9.....	—	—	—	—	—	—	—	3	—
20 and over.....	—	—	—	—	—	—	—	—	—

¹ Percentage distribution of the total dollar amount of non-real-estate farm loans of \$1,000 or more made by insured commercial banks during the week covered by the survey.

² The approximate compounded annual interest rate on each loan is calculated from survey data on the stated rate and other terms of the loan. In computing the average of these estimated effective rates, each loan is weighted by its dollar amount.

³ Large banks are banks in survey strata 1-3, corresponding approximately to banks with over \$400,000,000 in total assets as of September 1978.

Source: Federal Reserve quarterly survey of terms of bank lending to farmers.

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"Farm Credit Conditions in the Fifth District," Federal Reserve Bank of Richmond, Richmond, Va. 23261.

Agricultural Letter, Federal Reserve Bank of Chicago, P.O. Box 834, Chicago, Ill. 60690.

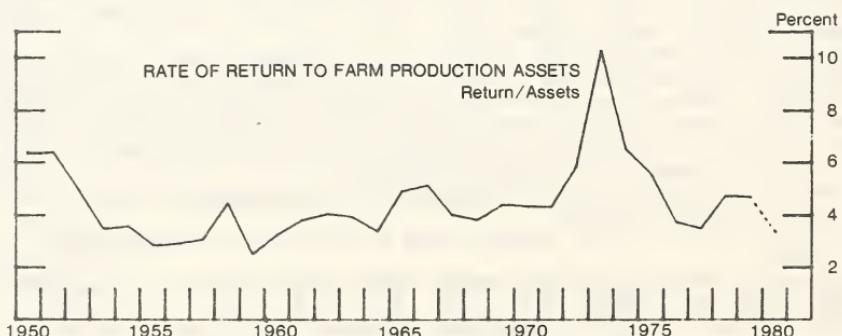
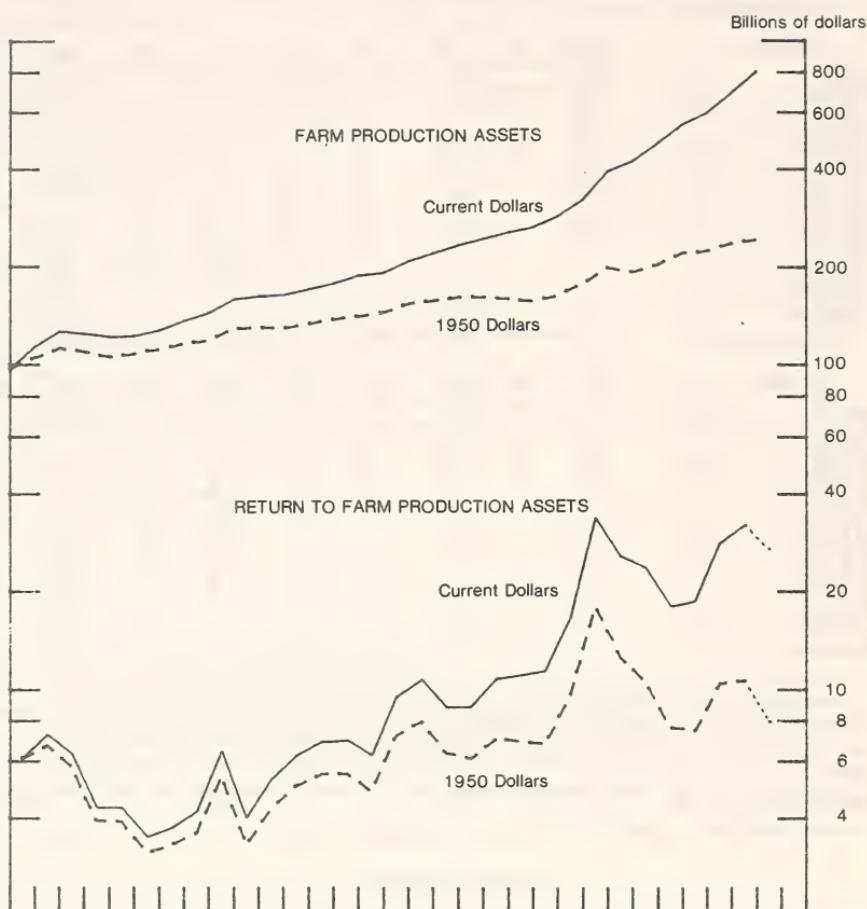
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Chart 1

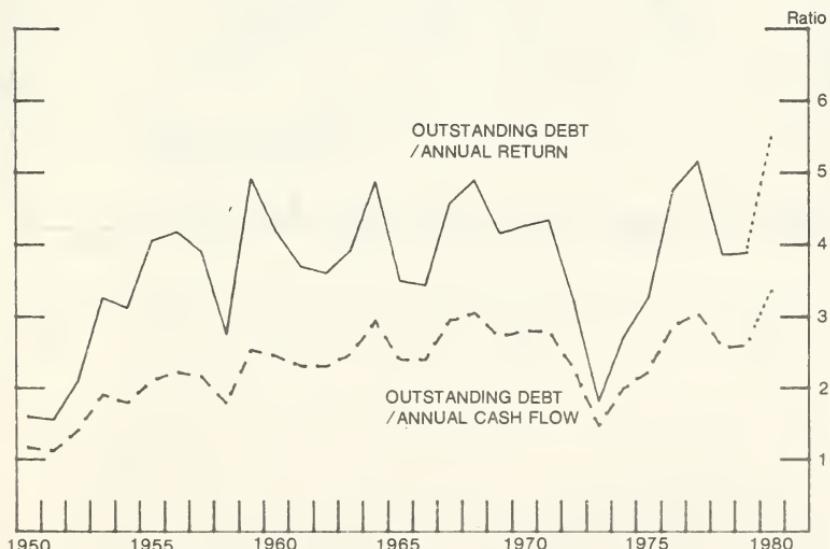
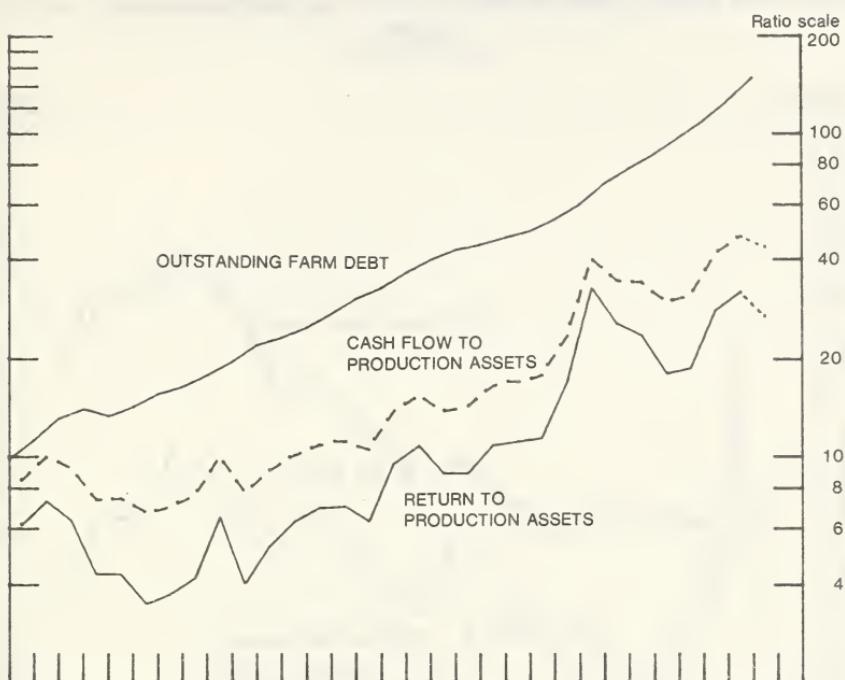
Return to Farm Assets Compared with Value of Assets



Returns shown for 1980 are based on USDA forecasts of farm income and expenses published in March 1980.

Chart 2

Farm Debt Compared with Income Flows to Farm Production Assets



Farm debt excludes CCC loans and debt on operators' dwellings

Income flows shown for 1980 are based on USDA forecasts of farm income and expenses published in March 1980.

Chart 3

Average Loan/Deposit Ratio at Insured Commercial Banks
Quarterly

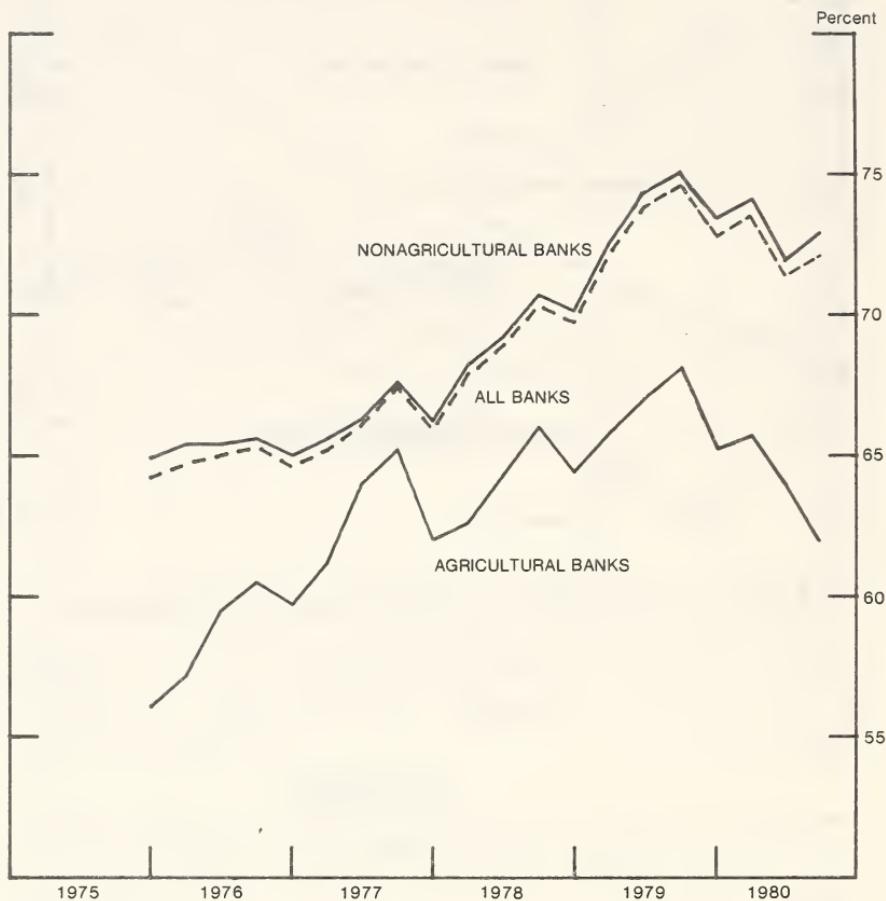


Chart 4

Average Farm Loan Interest Rates at Rural Banks Compared With Prime Rate

Quarterly
First Day of Quarter

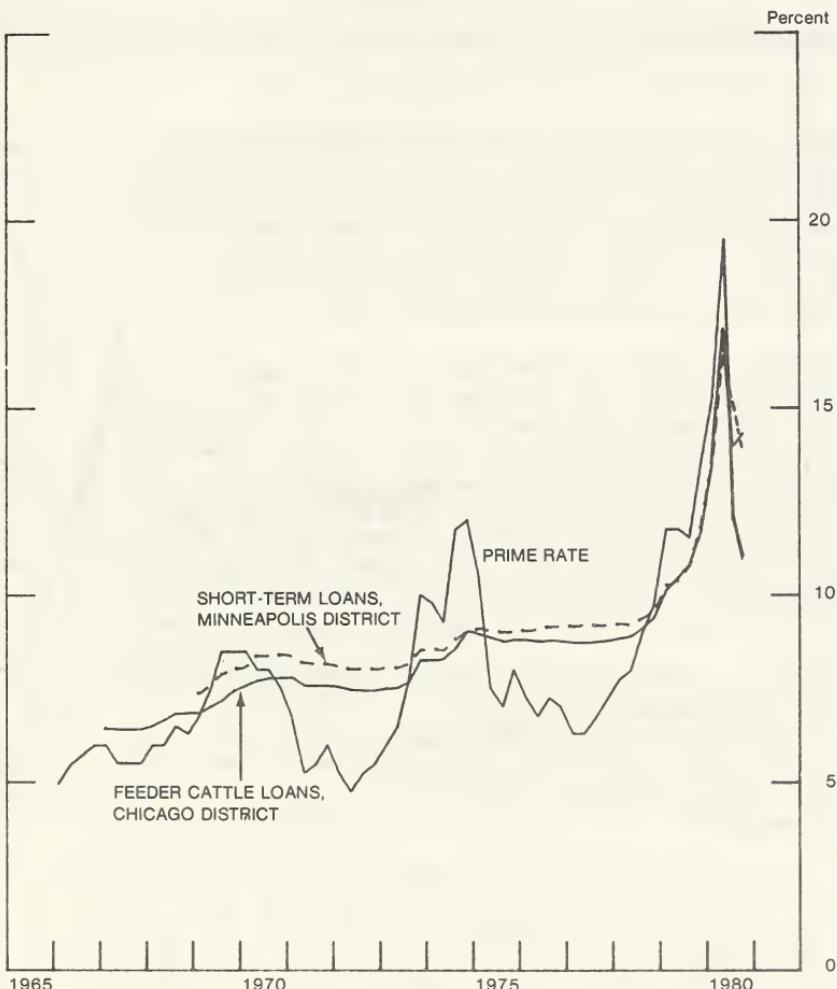
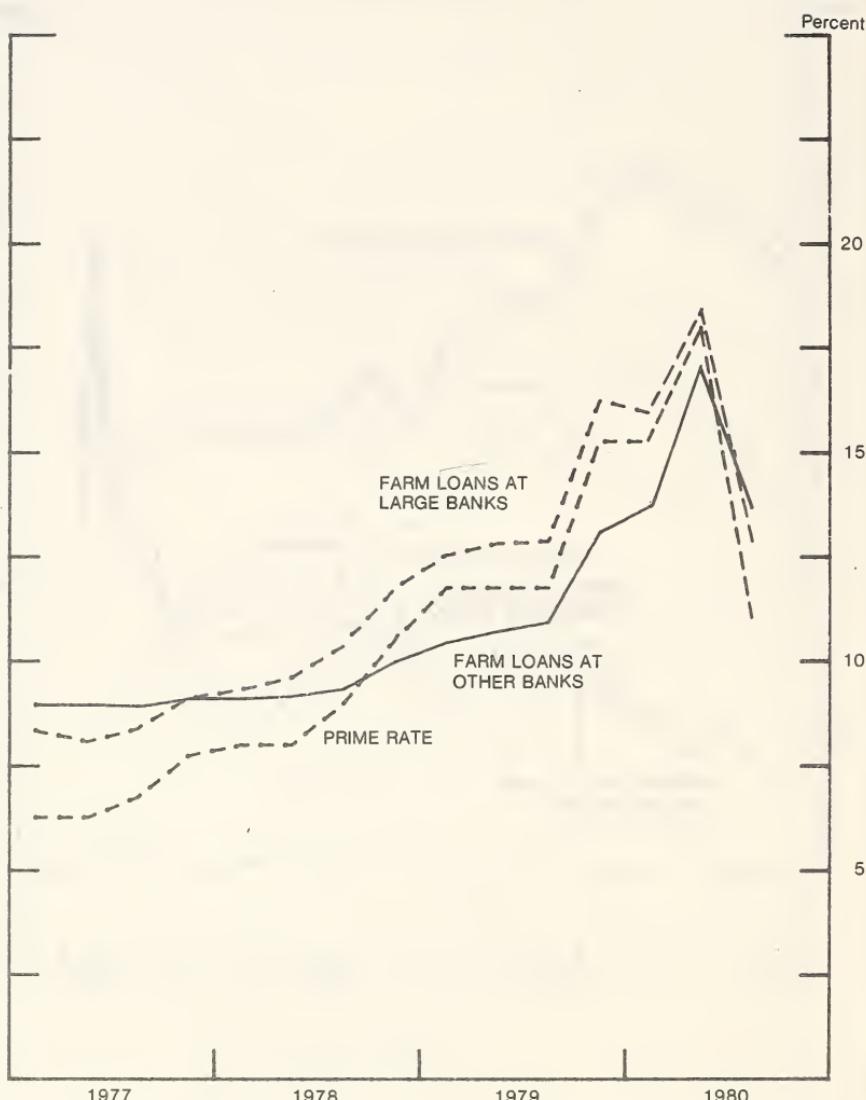


Chart 5

Interest Rates Charged By Commercial Banks
First Week of Second Month of Quarter



Source: Federal Reserve Quarterly Survey of Terms of Bank Lending to Farmers.

"Large banks" are banks in survey strata 1-3, corresponding approximately to banks which now have over \$400 million in total assets.

COMMENTS ON USDA AGRICULTURAL FINANCE OUTLOOK

(By George D. Irwin, Economic Analysis Division, Farm Credit Administration)

The USDA agricultural finance statement is generally an optimistic one. It forecasts improving farm income and generally strong agricultural credit demand, although perhaps delayed until 1982 in those areas which suffered from drought in 1980. This demand will be based on a healthy sector rather than one requiring distress financing. It forecasts effective fiscal and monetary policies resulting in an early easing of interest rates, although comment on the extent and shape of the decline is hedged.

I find it easier to agree with the assessment of the agricultural situation than with that on interest rates. In fact, something of an ebullient mood seems to be developing in the wake of the recent commodity price increases, and this could cause loan demand for farm capital purposes to explode well beyond USDA projections. Otherwise, I generally agree with USDA views on the farm sector prospects, and will concentrate on the financial markets. I also differ somewhat on the interpretation of the conditions in the spring of 1980. I also feel it is necessary to comment a bit on structure of the financing industry and changes in financial instruments which we are seeing at the beginning of the 1980's.

First, the spring 1980—the report says “In the northern and western edges of the Corn Belt, many profitable farms had difficulty obtaining loans.” The summary also refers to “this year’s financial crisis.” I would observe that many may indeed have had difficulty obtaining funds from their usual source—the commercial bank. Many of them were illiquid, and many more faced borrowers whose requirements exceeded their lending limits.

However, the PCA and FLB systems at no time had any shortage of funds. They, in fact, grew at record rates during most of the first half of 1980. At most, creditworthy commercial borrowers coming to the Farm Credit System for the first time might have suffered some delay in the spring months due to manpower pressures created by the unprecedented demand. Several other factors were involved. The Farm Credit System was also at the peak seasonal load for its regular customers, and the conditions described in the USDA paper called for more thorough credit analyses for them. It was also a time for commercial banks to weed out the lower quality accounts in their loan portfolios, and many sought out the Farm Credit System. These, too, required additional servicing time. Further, the interest rate differentials between the System and other lenders may have attracted additional applicants, particularly to the FLB system for short-term

loan purposes, before introduction of loan fees and adoption of voluntary credit restraint slowed the trend. The workload was compounded in some areas by commercial bank referrals of good customers to the FLB rather than the PCA, for either interest rate or competitive reasons. Normal FLB loan processing requires considerably longer than PCA processing, because of the first mortgage security requirements. The same considerations probably stimulated commercial bank referrals to the economic emergency lending program of Farmers Home Administration and to Commodity Credit Corporation. Thus, I doubt that 3.5 percent of the 1980 acres would have gone unplanted in the absence of these Government actions, as seems to be implied on page 4 of the paper. Finally, a good portion of the complaints about "credit unavailability" did not reflect actual lack of credit, but reluctance or inability to pay going market interest rates. Farmers were in an income squeeze, and any opportunity for lower rates was extremely attractive to them. The same harsh pressures of the money market will continue in the 1980's, and will require adaptation by farmers. Neither the Farm Credit System nor any other lender would use such a short-term situation to cut off otherwise sound borrowers. A Farm Credit System policy referred to as "forbearance," is to look through any short-term distress to long-term viability.

Second, let me comment a bit on the forecast of rapid improvement in interest rates, presumably due to a new administration getting control of the economy and establishing economic policies that squash inflationary expectations. The USDA statement represents a conscientious effort to bring in the important macroeconomic consequences. I am also pleased with the recognition that real interest rates as well as nominal rates have a role in economic explanations. Real rates are often signaling economic actions far different from those suggested by nominal rates, particularly when considered simultaneously with marginal income tax rates in an inflationary period.

My quarrel is with the timing of the interest rate forecast. For we can all agree that policies to control inflation, long an economic need, have now become a political imperative. The analysis expects fiscal policy to be stimulative, with tax cuts right away and lagged response on the expenditures side. It argues that this will signal the public that it should revise inflationary expectations and bring interest rates down in the spring months.

I don't see things improving that quickly. This forecast implies a rising deficit in the short term, with increased Treasury borrowing creating more demand for funds. At the same time, the Federal Reserve will be restricting money supply. If expectations do turn favorable, won't business expansion plans be implemented and create further loan demand in the short term? I also feel the lags built into the interest rate structure are longer than one or two quarters. Events which have already occurred may have an inflationary impact next spring, which improved expectation will have to offset. Finally, we know there will be further CPI increasing pressure coming from rising food prices in 1981 as a result of 1980 production conditions, and as a result of completion of decontrol of domestic petroleum prices on or before October 1 of next year. These will be built into

automatic escalators on various wages and prices, and into the core inflation rate. I would anticipate that an improvement in expectations can bring this core rate down only with a lag. We must recognize that these changes in expectations toward inflation would increase both the demand for funds and the supply of savings. I would expect that we are embarking on a path of improved results on inflation, but I expect progress to be very gradual. Interest rates will be volatile as they start trending slowly downward, once inflation expectations moderate and new economic policies start to take effect. The pattern depends also on the Federal Reserve correctly anticipating the public's demand for money based on these revising expectations. The uncertainty over possible new economic programs and possible new "oil shocks" or other disruptions in 1981 will make it difficult for the public and the Federal Reserve to chart steady courses.

Events culminating in the Depository Institutions Deregulation and Monetary Act of 1980 will cause an evolution in the commercial banking structure in the 1980's. This may be more significant than either of the impacts mentioned in the USDA paper. Disintermediation was not really a factor, and higher interest rates to farmers were evolving even without the act. Rural banks have grown more slowly than the borrower-customers, meaning more and more have to go to secondary sources to overcome single-borrower limits. The advent of money market rates on savings certificates, and now the phaseout of regulation Q have linked smaller banks' cost of funds more closely to interest rates in national markets. More importantly, they have narrowed the operating spreads of such banks, reducing their profitability. The 1980 act further tightens the vise, by introducing local competition of thrift institutions in providing services of checking-type accounts, and of lending for various purposes formerly the province of banks, and have required monetary reserves in the Federal Reserve System. To survive, smaller rural banks are going to have to evolve to meet these pressures, via expansion, correspondent relationships, and other devices for obtaining wholesale funds that they can relend at a profit. The financial pressures to do something will be intense, and will make various forms of branching more likely. We expect participations with PCA and discounting with FICB's will become increasingly attractive alternatives to the smaller rural banks during the 1980's.

The mortgage financing area has seen major evolution in financial instruments during the past 2 years, and will continue to do so in coming years. Few institutions followed the FLB's into variable interest rates in the past decade. Now the same financial variability that forced FLB's to innovate in 1968-70 in imposing change on other institutions. During continued inflation, the long-term, fixed-rate mortgage has become an unacceptable financial investment for insurance companies, individual investors, and savings and loans. We are beginning to see shorter terms, periodic adjustment of interest rates during the life of the contract, partial amortization with balloon payments at the end of the contract, and even equity positions or shared appreciation between lender and borrower. So long as inflation and interest rate volatility are the primary threats, borrowers are going to have little alternative for long-term contracts with savers and their representatives.

Seller financing via contracts may be the one area of continued fixed rate financing. The impacts of estate tax valuation for farm purposes could cause closer holding of land in family farms in the future, perhaps stimulating contract sales and reducing the amount of open market land sales. It is an area needing much further study.

But another source of funds for agriculture may grow, if land values continue their historic performance as an inflation hedge. Farm land will continue to attract direct investment interest from various sources other than farm operations. This was a growing trend toward the end of the 1970's, which would abate only gradually as inflation concern relaxed. But there appears to be only moderate reason for concern about the level of land prices, as we move into a decade where tightening worldwide stocks in relation to demand should translate into generally strong farm incomes, picking up any gap left by less inflationary expectation in land prices.

Finally, farmer loan repayment problems will be significant in areas hit most heavily by the 1980 drought. It will be especially significant in those areas which have had problems for the past 2 or 3 years. During this period, we have seen rapid expansion in the Farmers Home Administration economic emergency lending activity. Unfortunately, we lack good information on the proportion of these accounts which reflect farm distress situations, versus the proportion which reflect other reasons. As noted earlier, commercial bank illiquidity and interest rate differentials have been among those reasons.

Since this program is due to expire during 1981, the extent of distress may be a significant determinant of prospects for extending legislation. However, budget considerations and an increasing reliance on competitive economic efficiency could suggest significant turnaround in the role of Government in financing farming, a corresponding shakeout of producers that have survived as a result of those programs, and a different risk environment for commercial lenders. All these would be consistent with an election result placing increased emphasis on self-reliance for all sectors. This potential redirection may generate significant policy debate in 1981.

REVIEW AND OUTLOOK: FARMERS HOME ADMINISTRATION LENDING

(By James E. Thornton, Associate Administrator, Farmers Home Administration, U.S. Department of Agriculture)

Throughout its 45-year history, the Farmers Home Administration has played an increasingly important role in meeting the credit needs of rural America.

The number of FmHA loan and grant programs, the scope of those programs, the agency's annual loan volume, and the number and amount of loans outstanding all have grown.

FmHA's role has been and continues to be that of a lender of last resort, providing financing to borrowers unable to get all or part of the credit they need from other lenders at reasonable rates and terms.

The agency's growth attests to the need for this supplemental credit. We have no doubt this need will be as great or greater in the years ahead as it has been in the past.

But while we have no doubt that the need for FmHA's programs will continue to grow, we are deeply concerned about FmHA's ability to serve its borrowers and to protect the interests of the Government.

The size of the agency's field force has not kept pace with the growth in loan volume and loans outstanding. The ability of FmHA's National Finance Office in St. Louis to provide service to borrowers and staff has not developed as it should have.

This has led to unconscionable delays in disbursing funds for loans which have been approved. It has meant that the agency's field staff has not been provided the timely information it needs to properly supervise borrowers—supervision which is essential for these borrowers to succeed and to protect the Government's interest in its collateral.

The result has been an alarming increase in loan delinquencies and expected increases in foreclosures. Unless the conditions that have led to these situations are corrected, we foresee serious future consequences for our programs and for the economics of rural areas.

TABLE I.—FmHA LOANS AND GRANTS, FISCAL YEAR 1980

	Loans or grants	Amount
Farmer programs:		
Farm operating loans	32,211	\$874,829,000
Farm ownership loans	12,972	954,052,080
Recreation loans (individual)	26	2,276,000
Emergency loans	54,394	2,266,890,320
Economic emergency loans	44,887	2,185,483,140
Grazing association loans	3	4,245,000
Soil and water loans (individual)	2,602	54,635,900
Irrigation and drainage loans	6	483,800
Indian tribe land acquisition loans	3	6,380,000
Farmer programs, total	147,104	6,349,275,240

TABLE I.—FmHA LOANS AND GRANTS, FISCAL YEAR 1980—Continued

	Loans or grants	Amount
Rural housing programs:		
Low-moderate income housing loans.....	104,224	\$2,825,740,950
Guaranteed above-moderate income housing loans.....	597	18,865,830
Very-low-income repair loans.....	7,570	21,923,910
Very-low-income repair grants.....	8,589	23,999,990
Rural rental housing loans.....	1,539	881,336,140
Rural assistance programs:		
Rental housing (19,617 units).....		389,845,950
Labor housing (383 units).....		3,144,050
Farm labor housing loans.....	196	24,576,970
Farm labor housing grants.....	25	22,279,100
Site loans.....	11	1,251,390
Self-help housing grants.....	48	6,198,740
Rural housing supervisory assistance grants.....	19	1,500,000
Housing programs, total.....	122,818	4,220,663,020
Community programs:		
Water and waste disposal loans.....	1,825	699,999,700
Water and waste disposal grants.....	1,011	298,734,300
Development grants other than FmHA.....	343	55,638,470
Community facility loans.....	674	240,000,000
Industrial development grants.....	196	9,968,610
Watershed and flood prevention loans.....	10	9,893,000
Resource conservation and development loans.....	8	1,818,700
Rural development planning grants (ADA).....	184	6,000,000
Community programs, total.....	4,251	1,322,052,780
Business and industrial loans.....	1,160	1,073,766,920
FmHA program totals:		
Loans.....	264,918	12,148,448,750
Grants (FmHA).....	10,072	761,670,740
Other than FmHA grants.....	343	55,638,470
Total, FmHA program.....	275,333	12,965,757,960

NEAR-RECORD LENDING IN FISCAL YEAR 1980

The year just past, fiscal year 1980, was a near-record year for FmHA. As table I shows, the agency made loans and grants totaling nearly \$13 billion to more than 275,000 recipients.

The fiscal year 1980 total was next to an alltime high. The record was set in fiscal year 1979, when FmHA made nearly 295,000 loans and grants for a total of nearly \$14.7 billion.

Congress has not yet approved the FmHA budget for fiscal year 1981. The appropriation bill approved by the House provides for a total \$12.2 billion in FmHA loans and grants for the current fiscal year. (See table II.)

TABLE II.—*FmHA budget approved by House—fiscal year 1981*

	Billions
Farm loans.....	\$5.7
Rural housing loans and grants.....	4.6
Rural development loans and grants.....	1.9
Total.....	12.2

That total does not include a recently revised estimate for FmHA emergency disaster loans for the current fiscal year. Nor does it include estimates for two new FmHA programs: Emergency disaster loans for actual losses from natural disasters to borrowers able to get credit elsewhere and loans for facilities producing nonpetroleum fuel which FmHA will make under the Energy Security Act. Adding these estimates to the total in the House bill brings the grand total for fiscal year 1981 to approximately \$15 billion—a new alltime record.

SHARE OF TOTAL FARM DEBT INCREASES

One indicator of FmHA's role as a supplemental lender is its share of total outstanding U.S. farm debt.

The FmHA share is a small proportion of the total of all lenders. But it has increased steadily in recent years. If our projections for lending to farmers in fiscal year 1981 are borne out, it will continue to increase.

According to estimates by the U.S. Department of Agriculture's Economics and Statistics Service, FmHA will hold \$20.4 billion in farm loans on January 1, 1981—11.5 percent of the total of \$177.7 billion ESS estimates will be outstanding on that date.

Its share of the total outstanding January 1, 1980 was 9.9 percent—\$15.6 billion of a total of \$157.3 billion. On January 1, 1979, FmHA held 7.3 percent of the total—\$9.9 billion out of \$136.1 billion.

FmHA's share of estimated total farm real estate debt outstanding on January 1, 1981 ranks behind those of other institutional lenders and individuals and others.

The agency will hold an estimated 8.7 percent—\$8.3 billion—of the \$95.4 billion ESS estimates will be outstanding on January 1, 1981. FmHA held 8.0 percent—\$6.6 billion—of the \$82.1 billion outstanding January 1, 1980.

FmHA ranks after institutional lenders and merchants and dealers who provide financing for buyers in its share of total non-real-estate farm debt.

The ESS estimates FmHA's share of total non-real-estate farm debt outstanding January 1, 1981 will be 14.7 percent—\$12.1 billion out of \$82.3 billion. That compares to 11.9 percent of the total on January 1, 1980—\$9 billion of \$75.2 billion.

GROWTH IN PAST FOUR YEARS

Farmers Home Administration's growth has been particularly evident during the past 4 years. Its alltime, 45-year total volume of loans and grants is approximately \$86 billion. Loans and grants totaling more than half of that—\$45 billion, were made in fiscal years 1977 through 1980.

During that period, FmHA became a major force in rural development lending. Its nonfarm rural development loans and grants—for housing, essential community facilities, and business and industry—accounted for about half of the agency's total loan and grant volume in fiscal years 1979 and 1980.

FmHA has begun numerous new programs, and made numerous significant changes in existing programs, during the past 4 years. These include:

Limited resources farm loans.—These are made to family farmers and ranchers who not only cannot get credit elsewhere but cannot afford to pay the normal interest on FmHA farm loans. They include farm ownership loans, for up to 40 years, and operating loans for up to 7 years. The current interest rate is 5 percent. More than 22,000 of these loans have been made for about \$1 billion. Limited resource borrowers graduate to higher interest rates when their situations improve.

Economic emergency loans.—Congress created this program in 1978 to provide loans to farmers caught in a credit crunch caused by tight credit conditions, high production costs, and/or low prices.

EE loans originally were made for refinancing debts, operating expenses, and farm real estate. Regulations adopted by FmHA earlier this year severely restrict their use for refinancing.

Targeting loans.—A policy of earmarking loan funds for borrowers who need the loans most. Twenty-five percent of farm loan funds are targeted for limited resource borrowers. Twenty-five percent of funds for subsidized single family housing loan funds are targeted for families with less than half of the median community income. Seventy-five percent of the number of single-family housing loans in fiscal year 1980 were subsidized. Communities of less than 5,500 population are given priority for community facility loans.

Expanded business and industrial loan program.—Loan guarantees under this program were expanded from \$350 million to \$1 billion per fiscal year, but this fiscal year will be reduced to \$750 million and to \$500 million in all likelihood in 1982.

New grant programs.—FmHA began making rural development planning grants to district development commissions, and administering a program of grants to prepare for development of housing and utility systems in communities where coal and uranium mining has been expanded.

Rural rental assistance.—Funds were made available for an existing program to supplement rent paid by tenants to operators of rural rental housing for senior citizens and other low-income people.

Population increase for community facility loans and grants.—Towns of up to 20,000 now are eligible for loans and grants for community facilities other than water and waste disposal systems. The ceiling for water and waste disposal loans and grants remains at 10,000.

Home weatherization loans.—Loans for improving rural homes to resist weather, billed to owners through rural electric cooperatives or other utility systems.

Limited foreclosure policy for farm loans.—FmHA will not foreclose on a delinquent farm borrower affected by circumstances beyond his or her control but with a reasonable chance of success. The agency will foreclose only as a last resort, to protect the Government's interest.

Higher farm loan ceilings, other changes.—Farm loan ceilings per borrower were raised from the unrealistically low levels of \$60,000 for operating loans and \$100,000 for farm ownership loans to the present levels for insured loans of \$100,000 for operating loans and \$200,000 for ownership loans; and for guaranteed loans, \$200,000 for operating loans and \$300,000 for ownership loans.

Farm loans to family partnerships and corporations, and formerly prohibited, now are permitted. The interest rate for farm loans was increased to a formula rate based on the cost of money to the Government, plus up to 1 percent, for borrowers able to afford that rate.

Small-scale hydroelectric loans.—FmHA has approved loans to add to and reactivate seven small hydroelectric plants and for an engineering study at small dam sites.

ECONOMIC EMERGENCY LOAN PROGRAM EXTENDED

Congress this year extended the economic emergency loan program to September 30, 1981. It originally had been scheduled to expire May 15, 1980. An additional \$2 billion was provided for the program; the original \$4 billion had been used.

FmHA loaned \$1.15 billion of the additional \$2 billion by the end of fiscal year 1980. The agency will have an estimated \$1.3 to \$1.4 billion for EE loans this fiscal year if it is permitted to relend principal that has been collected. Otherwise it will have \$850 million for EE loans.

The law mandated a study of EE borrowers to determine if the program had met its objectives and if it should be extended beyond the current expiration date. FmHA has completed this study and will report its findings soon.

Another law placed ceilings on FmHA emergency disaster loans and provided for phasing out such loans for purposes of major changes in farming operations and annual production expenses.

Loans for actual losses from natural disasters are limited to the amount of loss or \$500,000—whichever is less. Loans for major changes and annual production expenses were limited to \$1.5 million per borrower for fiscal year 1980. They're limited to \$1 million per borrower for fiscal year 1981; \$500,000 for fiscal year 1982, and will be eliminated after fiscal year 1982.

TAKEOVER OF SBA FARM LENDING

Congress this year granted FmHA authority to make loans that previously had been made by the Small Business Administration to farmers who suffer losses from natural disasters.

This change virtually takes SBA out of the farm loan business—a business SBA had not wanted to be in. SBA said its staff lacked the knowledge of agriculture needed to make and service farm loans, and that FmHA was better equipped to handle that job.

The new authority represents a major change for FmHA, since SBA made, and FmHA now will make, loans to farmers who are able to get credit from commercial or cooperative lenders or other sources. FmHA previously has made loans only to borrowers unable to get credit elsewhere. That requirement remains in effect for all other FmHA loan programs.

Creditworthy borrowers will face stringent restrictions on the new FmHA loans. They'll be made only in designated areas hit by natural disasters for actual losses caused by these disasters—not for annual production expenses or major changes in operations.

The loans will be limited to \$500,000 or the actual amount of loss—whichever is less—per borrower. They'll carry a cost-of-money interest rate. They'll be for losses from disasters occurring on or after July 3, 1980, the day after the Small Business Development Act of 1980, which gave FmHA this authority, became law.

FmHA estimates the new loans to creditworthy borrowers will add \$400 million to its emergency disaster loan program for fiscal year 1980.

SYNTHETIC FUEL LOANS

FmHA has begun financing plants which will produce nonpetroleum fuel. It's an important new area of lending for the agency—a program designed to help reduce the Nation's dependence on imported petroleum.

The loans will be made under title II of the Energy Security Act of 1980, also called the Biomass Energy and Alcohol Fuels Act of 1980. The act assigns responsibility for financing plants producing synthetic fuel to USDA and the U.S. Department of Energy. DOE will finance plants capable of producing more than 15 million gallons of fuel alcohol per year; FmHA, those which will produce 15 million gallons or less.

FmHA will make insured loans of \$1 million or less per project for small-scale plants. These will be mainly on farms and will be capable of producing up to 300,000 to 500,000 gallons of fuel alcohol or the equivalent per year. FmHA will guarantee loans for intermediate-scale plants which will produce up to 15 million gallons per year.

Most of the plants we finance will use corn as a feedstock, but some will use other crops. Most will produce fuel alcohol but some will produce methane, wood pellets, or other forms of biomass fuel.

Insured biomass loans will be at the formula, cost-of-money interest rate. Guaranteed loans will be at rates negotiated by borrowers and lenders. Loans will be for up to 30 years or for the expected useful life of the facility—whichever is less.

Loans submitted under this program cannot be for more than 90 percent of construction costs and then FmHA will only be able to guarantee up to 90 percent of the principal amount of such loans.

FmHA will make or guarantee loans only for construction, acquisition, or conversion of plants—not for working capital. We will give priority to application for plants which will use nonpetroleum fuel for primary heat in the production process.

Congress has allocated \$525 million for FmHA biomass loans in fiscal years 1981 and 1982. FmHA expects to make about 170 to 200 insured loans for about \$150 million, and to guarantee 25 to 30 loans for about \$385 million.

The geographic and population restrictions that apply to other FmHA programs do not apply to its biomass loans.

Before the new biomass loan program went into effect, FmHA guaranteed 29 loans totaling \$377.8 million for plants producing fuel alcohol under its business and industrial loan program.

Plants financed under the B. & I. program will produce an estimated 264 million gallons of fuel alcohol per year. Those financed under the new program are expected to produce an estimated 260 million gallons of fuel alcohol or the equivalent per year. The total—524 million gallons—is more than the national goal of production of 500 million gallons of fuel alcohol by the end of 1981 and more than half of the goal of 920 million gallons or the equivalent by the end of 1982.

Most of the plants are expected to use corn as a feedstock. If all used corn, they would use about 225 million bushels per year.

Farmers Home also will finance on-farm production of synthetic fuel under its farm loan programs. Plants financed under these pro-

grams will be extremely small scale, since the loans will be subject to the normal loan ceilings. The volume of these loans may be about \$10 million for the fiscal year.

RECORD EMERGENCY DISASTER LOAN VOLUME

The FmHA outlook for fiscal year 1981 includes a record volume of disaster emergency loans. Based on a survey of State FmHA offices conducted late this summer, we estimate these loans could total \$5.1 billion this fiscal year.

If this estimate holds, disaster emergency loans will be by far the main type of FmHA lending this fiscal year, and the main reason total loan volume will be at a record high. The estimated \$5.1 billion is more than twice the \$2.27 billion volume of disaster emergency loans in fiscal 1980.

This year's widespread and prolonged drought is the main reason for the expected huge volume of emergency disaster loans. At the start of this fiscal year on October 1, nearly half of the Nation's counties, 1,416 counties in 23 States, had been designated emergency disaster areas due to drought alone.

Most of the nearly 54,000 disaster emergency loans FmHA made during the past fiscal year were due to drought. In many parts of the country, the full extent of loss wasn't evident at the start of the new fiscal year. Thus, a number of eligible farmers in those areas applied for loans after the start of the fiscal year, or have yet to apply.

Economic emergency loans volume will be down this fiscal year, since the funds available for these loans will be less than the \$2.2 billion used for 45,000 EE loans in fiscal 1980.

We expect that the dollar volume of regular farm loans this fiscal year will be about the same as in fiscal 1980. The number of loans may be down as much as 10 percent, since continued inflation means bigger loans.

Sharp increases recently in the liquidity of many rural banks should help reduce operating loan demands this next year that otherwise might have been directed toward FmHA.

LESS ABILITY TO SERVE FARMERS

Lack of funds is among the reasons FmHA will be less able than before to meet farmers' credit needs in the coming fiscal year. The other reasons: lack of personnel and inordinate delays in disbursing funds after loans are approved due largely to required quarterly apportionments of appropriated funds.

Some States have backlogs of applications that far exceed the funds they will have available for nonemergency farm loans this fiscal year. Farmers have complained, with justification, about waiting a year or more for funds after their FmHA loans are approved.

Among other things, FmHA will be less able to refinance farmers who need to restructure their debts in order to stay in business. While refinancing was one of the main purposes of the EE program when it was begun, FmHA adopted regulations severely restricting the use of EE loans for refinancing early this year due to abuses of the program and the need to make funds stretch to the end of fiscal 1981.

EM, FO, and OL loans still may be used for refinancing. But their use for this purpose is limited by ceilings on the loans, which may be less than a farmer needs to stay in business.

More foreclosures may be the result. FmHA will stick to its policy of foreclosing only as a last resort. But private lenders may foreclose on borrowers who FmHA is unable to help.

PERSONNEL, COMPUTER CAPACITY LAG

FmHA's field staff has grown at a much slower rate than its loan volume and loans outstanding. The gap becomes wider every year.

Graph I shows the drop in FmHA staff years relative to annual loan volume and total amount of loans outstanding. Graph II compares FmHA's ceiling for permanent full-time employees with their workload: the number of loans made and serviced. That permanent full-time ceiling now is less than 9,000; temporary and part-time employees bring the total to about 12,000.

Graph III shows the growth in number of borrowers with loans outstanding, now 1.35 million. Graph IV compares annual percentage changes in total number of borrowers and number with delinquent loans.

Graph V shows numbers of delinquent borrowers in FmHA's major programs on March 31, 1977 through 1980. Graph VI shows the growth in outstanding principal balance of delinquent loans.

The increasing number of delinquent borrowers is shown on graph VII. Graph VIII shows number of borrowers and amounts delinquent by length of delinquency. Graph IX portrays the growth in average sizes of outstanding and delinquent emergency and single family housing loans.

TEMPORARY EMPLOYEES, COUNTY COMMITTEES

FmHA has hired or will hire 1,228 temporary employees this fall to help county FmHA offices process applications for disaster emergency loans and service existing loans.

The agency hopes to use county FmHA committees to review delinquent and problem loans and help problem borrowers develop realistic farm plans. We also hope to raise the pay of county FmHA committee members from the present \$12 a day plus travel to the level of members of county agricultural stabilization and conservation service committee members: \$39 a day plus travel.

It's anticipated that county FmHA committee members will work mainly with disaster emergency loan borrowers. Unfortunately, there are no plans to provide sufficient numbers of additional staff for other FmHA farm loan programs and for the growing number of nonfarm rural development programs.

The ability of FmHA's St. Louis finance office to provide service to the field is bad and is growing worse.

This office processes all disbursements and collections of money handled by the agency. It also maintains all borrower accounts and is responsible for the generation of all financial management reports needed by both field offices and national headquarters. Its automated accounting system and the computer hardware housing it is over 10

years old and is grossly inadequate to handle the growth and complexity of agency needs today—to say nothing of tomorrow's needs.

Failure to resolve these problems in the immediate future may force FmHA to shut down entirely or to reduce its operations to minimal levels.

GUARANTEED LOAN CHANGES

When FmHA gained the authority under the Rural Development Act of 1972 to guarantee loans by commercial and cooperative lenders, it was expected that the use of guaranteed loans would grow rapidly, possibly eclipsing FmHA's own insured loan programs.

This didn't happen, except for the business and industrial loan program, which consists almost entirely of guaranteed loans. FmHA guarantees farm and housing loans, but guaranteed loans account for extremely small proportions of those programs.

FmHA suspended guaranteeing EE and EM loans early this year. We resumed guaranteeing EE loans this month, and hope to resume guaranteeing EM loans soon, with changes that should make guaranteed EM loans more attractive to lenders.

The law limits the interest rate charged borrowers unable to get credit elsewhere for guaranteed disaster emergency loans for actual losses to 5 percent. FmHA had paid lenders who make these loans a subsidy amounting to the difference between 5 percent and the Government's cost of money. The subsidy in the future may be slightly larger: The difference between 5 percent and a rate agreed on by borrower and lender but not more than the lender's rate to his best farm borrowers.

For guaranteed emergency loans to borrowers able to get credit elsewhere the Government would pay lenders a subsidy amounting to the difference between the cost-of-money rate and the lender's best rate to his best farm customers.

FmHA now has authority to guarantee disaster emergency loans with variable interest rates, and can make and guarantee line-of-credit emergency loans.

SECONDARY MARKET

Lenders have complained about the lack of a secondary market for the guaranteed parts of farm loans, in contrast to B. & I. loans which enjoy a ready secondary market. At least four States now provide a secondary market for guaranteed farm loans.

They do this by issuing tax-exempt bonds and using the proceeds to buy the guaranteed portions of guaranteed farm loans. Since these agricultural development bonds carry favorable interest rates, lenders can make guaranteed loans at favorable interest rates.

The growing use of tax-exempt bond proceeds for such purposes is currently under review by both OMB and by the Department of Treasury at the request of FmHA.

Bankers and others have proposed over the years that the total amounts specified for guaranteed loan programs be counted as reserves against losses rather than ceilings. They have argued that such a plan is practical since losses in guaranteed loan programs have been almost nil.

There is interest in such a proposal in the current lame-duck session of Congress. Under this plan, a 3-to-1 leverage ratio would be applied to guaranteed loans under the Energy Security Act. Only one-third of the amount of each loan would count against total lending under the program. Such an amendment already has been passed in the Senate and is expected to survive a conference with the House soon.

RURAL DEVELOPMENT CREDIT SYSTEM

While these changes may help, they won't solve the basic problem: meeting the growing demand FmHA faces as the main Government source of credit for farming and rural development.

One of the innovative proposals for meeting this demand is for the creation of a rural development credit system. A Presidential rural development study commission which reported its findings in 1970 called for setting up such a system.

The original Senate version of the Rural Development Act of 1972 (although not the final act) would have established, among other things, a new nonfarm Rural Development Credit and Investment System modeled generally on the successful experience of the Farm Credit System with the initial capitalization provided by Federal funds, and repayment over time achieved through equity participation of borrowers and banks.

What should be appreciated about the proposal was the recognition that the emerging capital needs of rural communities and businesses were not likely to be satisfied through any single Federal agency. It is unlikely that American agriculture would be where it is today had not the Farm Credit System been established early in the 1930's. Most of rural America consists of small towns, with small banks in them that have only limited reserves. This lack of investment power by rural banks and lack of venture capital inhibits the ability of rural areas to share equitably in the Nation's growth and development. Additionally, many small communities cannot respond quickly either to decline or growth because they do not have the tax base or do not need enough money to issue bonds large enough for money-market competition.

Federal programs designed to help alleviate many of the rural conditions cited above have grown tremendously. But only a few are designed to reach out into total regions effectively. This is why the role of the Farmers Home Administration has expanded so dramatically into the fields of rural housing, community development and economic stimulation. The FmHA, with its network of State, substate and county offices; direct lending and grant activities; and its highly decentralized decisionmaking system, can only expect more, not less, pressure to expand its activities within the rural areas.

The crucial question, however, is how realistic it is to expect FmHA to continue to absorb or assume the role as principal development agency in rural areas. The possible dichotomy of missions that the agency may be faced with must be examined, namely its historical position of serving as lender-of-last-resort, as opposed to an expanding mission of supporting general community and economic development within rural regions. Are these two goals compatible or conflicting?

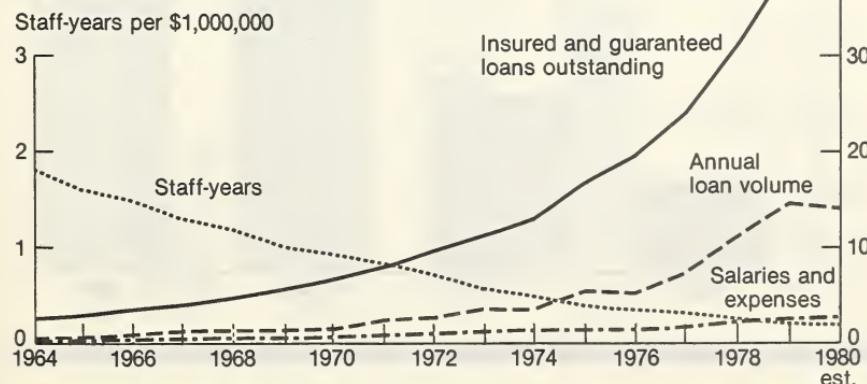
I believe that, by definition, development demands a strategic view beyond merely making annual commitments of money. One way by which large amounts of development capital might be made available in rural areas in the future is through the establishment of a new Rural Development Credit System similar to but totally separate from the Farm Credit System. Such a system could respond to emerging rural development capital needs and head off possible conflicts in mission orientation within FmHA. Such a system also would be free of the redtape and bureaucratic constraints normally imposed on Federal agencies, such as personnel ceilings and salary limitations.

The system would involve an initial capital investment by the Federal Government, phased in over a reasonable length of time, for example 10 years. All of this capital would eventually be paid back to the Treasury as borrower equity investment in the system. The system would be authorized to sell its own securities in the central money markets on the basis of a prescribed leveraging of its equity capital. Borrowers would be required to purchase equity in the system based on a small percentage of their loan amount. Loans would actually be made to borrowers either through participating commercial banks or the system's own offices.

Millions of Americans and their families are now moving back to small towns and medium-sized cities throughout the rural areas of the Nation—a significant reversal of the demographic trends of the 1930's through the 1960's. These demographic changes, combined with other factors influencing the supply and demand of capital in rural areas, suggest that both the Government and the private financial sector should rethink their traditional roles to help meet the capital needs of rural areas in the future.

GRAPH I

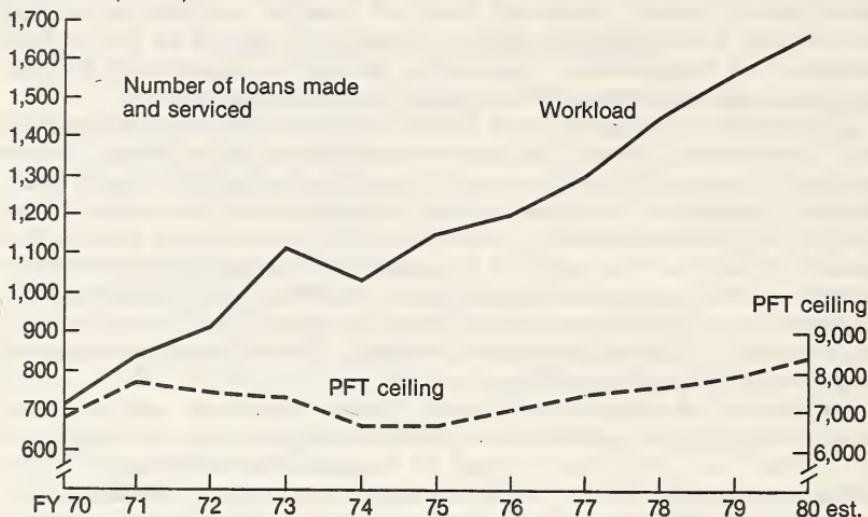
**Farmers Home Administration
Comparison: Insured and Guaranteed Loans
Outstanding, Annual Loan Volume, Salaries
and Expenses and Staff-Years per \$1,000,000
Loaned and Serviced**



GRAPH II

Total Compared With PFT Ceiling

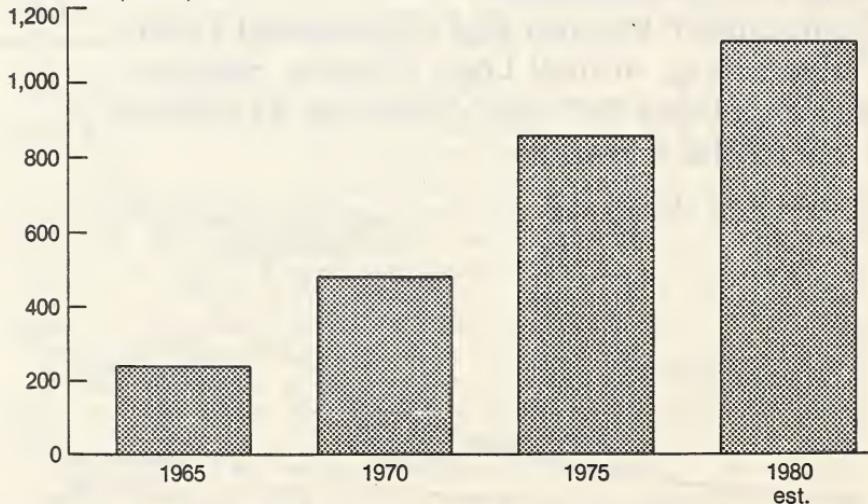
Workload (thous.)



GRAPH III

Total Number of Active Borrowers

Borrowers (thous.)

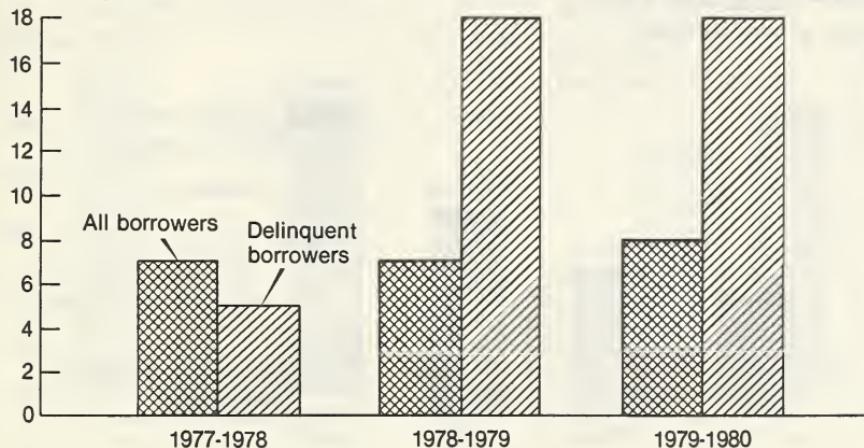


GRAPH IV

Individual Loans

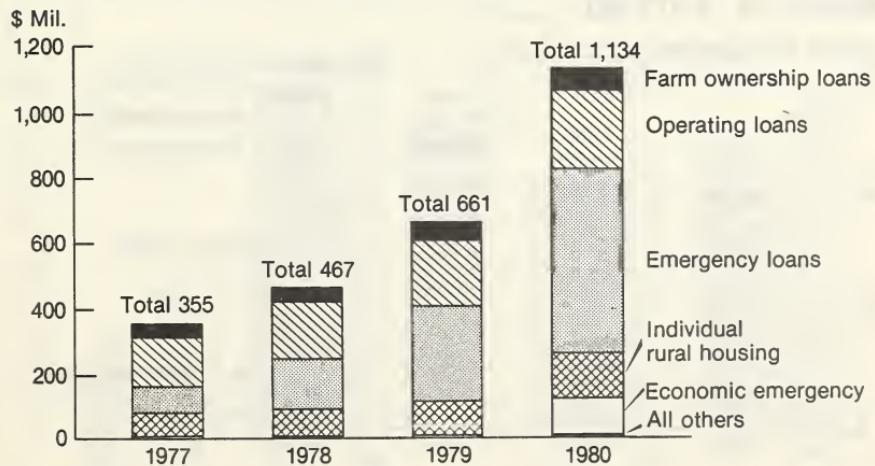
Number of Borrowers and Borrowers Delinquent

Annual percentage change
March 31, 1977-1980



GRAPH V

Loans to Individuals

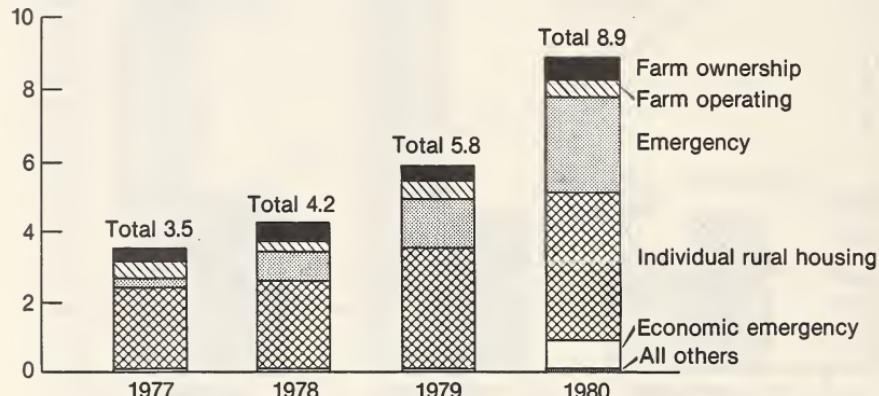
Total Dollars Delinquent By Major Program, March 31, 1977-80

GRAPH VI

Loans to Individuals

**Delinquent Loans-Unpaid Principal
Outstanding, Total and By Major Program,
March 31, 1977-80**

Dollars of principal (\$ bil.)

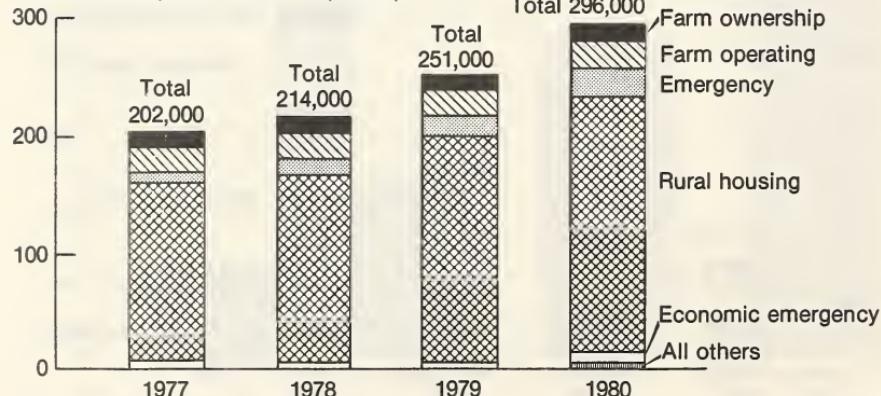


GRAPH VII

Loans to Individuals

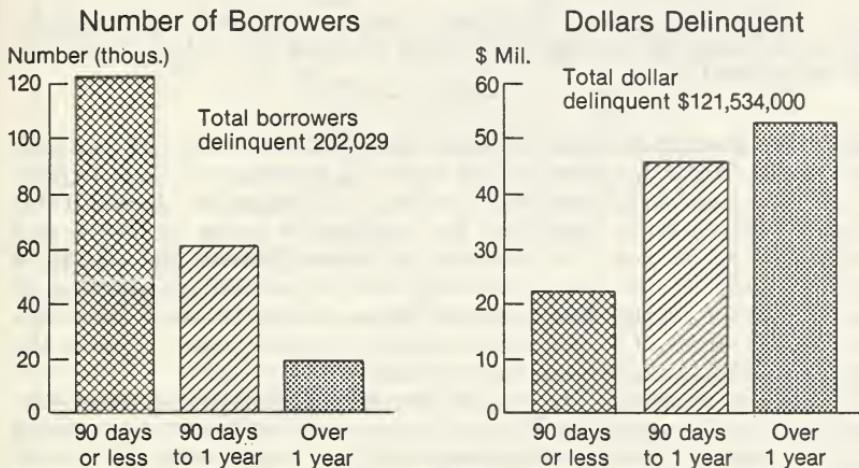
**Number of Borrowers Delinquent,
Total and By Major Loan Program,
March 31, 1977-80**

Number delinquent borrowers (thous.)



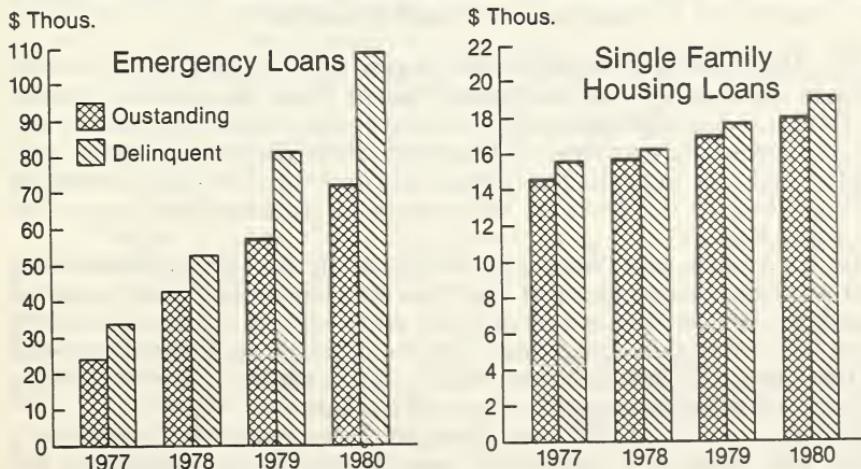
GRAPH VIII

Low Income Rural Housing Loans (Monthly Payment Borrowers)
**Number and Dollar Amount Delinquent,
 By Length of Delinquency, March 31, 1980**



GRAPH IX

Average Size of Loan
**Total Amount Outstanding and
 Delinquent Loans, March 31, 1977-80**



IMPACTS OF RECENT WEATHER ON CROP PROSPECTS FOR 1981

(By J. Larason Lambert and Raymond P. Motha, agricultural meteorologists, World Food and Agricultural Outlook and Situation Board, U.S. Department of Agriculture)

Weather anomalies again played a dominant role in the 1980 agricultural scene. Many important crop areas in Europe and Asia experienced extended periods of wet and/or cold weather. Agricultural impacts ranged from beneficial for wet-season crops in India and Southeast Asia to nearly disastrous for South Korean and Japanese rice and most Soviet crops. Rainfall deficits reduced production of many crops in North America and wheat yields in some Southern Hemisphere areas. The resulting declines to grain reserves make the crop prospects for 1981 even more crucial.

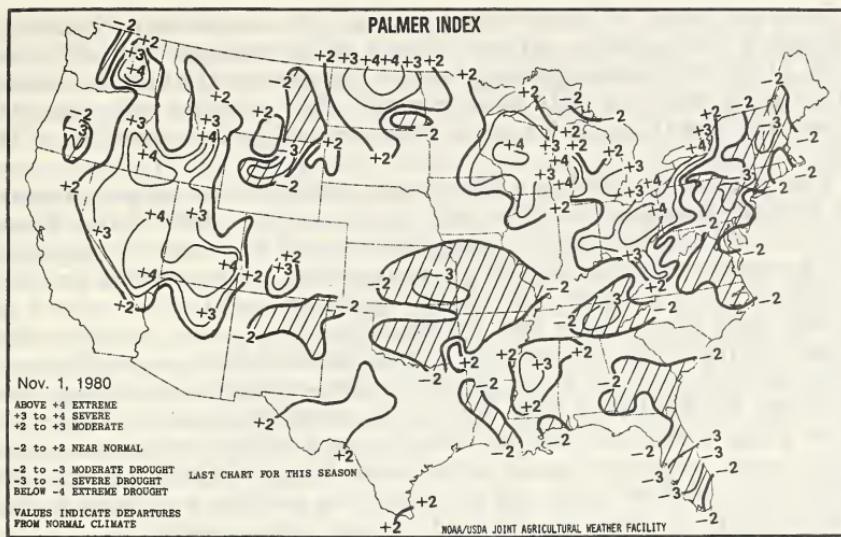
Autumn weather this year in the Northern Hemisphere has ameliorated conditions somewhat. Normally low evaporation rates associated with the cooler transitional season facilitate rapid recharge of soil moisture, and rainfall alone at this time sets the stage for moisture availability next spring. Much uncertainty remains, of course. Who could have foreseen the cold, wet growing season in European U.S.S.R. this year, or the heat wave in the United States? Such extreme seasonal weather cannot be predicted. However, with an awareness of current progress in fieldwork, and soil moisture conditions resulting from recent weather, one can use climatic data to anticipate probable scenarios next spring.

THE UNITED STATES (USING INFORMATION SUPPLIED TO THE WEEKLY WEATHER AND CROP BULLETIN)

The 1980 spring growing season began with expanding dry conditions in the northern Great Plains. Then in June, the heat wave began in Texas, and gradually spread to the east and northeast, encompassing southwestern portions of the Corn Belt. Moisture deficits were nearly at their peak in the upper Midwest by late July, stressing spring wheat in the Dakotas and corn in the southwestern portion of the Corn Belt.

Early August rain eased dry conditions in the spring Wheat Belt and northwestern portions of the Corn Belt. However, soils remained dry in the South until late September when abundant rains primarily from tropical storms covered much of the region. The dryness persisted in the Kansas Wheat Belt, and only in mid-October did storms bring substantial relief to eastern portions of the belt.

Figure 1 shows the Palmer Drought Index map for November 1, 1980. This index was designed to provide a means for evaluating the scope and severity of prolonged periods of abnormally wet or dry



weather. It integrates weather over several months, but does not always adequately indicate moisture conditions with respect to current plant water requirements. The map shows that conditions have improved substantially in many areas, especially in the northern Great Plains. However, long-term supplies are not nearly as good as last year at this time for much of the United States. Important agricultural areas in Florida and the central Great Plains currently have the most serious water deficits.

Winter wheat: Sowing of the 1981 crop had been nearly completed in the major production areas by early November. Sowing has lagged in eastern Colorado, southwestern Kansas, western Oklahoma, and northern Texas due to dry surface soils. Some reseeding was necessary because of spotty emergence, and relatively slow growth precluded much grazing in these areas. In spite of generally adequate subsoil moisture, rainfall and mild temperatures are needed immediately to encourage growth and thereby prevent soil blowing, which is a constant threat in this drier part of the Wheat Belt. Conditions for autumn growth are much better in eastern portions of both Kansas and Oklahoma, where rains arrived earlier than last year, and wheat should be in good condition. However, in the longer term, above-normal rainfall will be required to recharge subsoil moisture which will be needed for growth next spring.

In Montana and the Pacific Northwest, present wheat growing conditions and the outlook for next spring are much better than last year. In both areas, plants have emerged and developed satisfactorily. But more importantly, soil moisture supplies have improved substantially from a year ago, especially in eastern Washington.

Spring wheat: Abundant rainfall since midsummer over most of the cropping area has increased soil moisture dramatically. Only a few small areas still show abnormal moisture deficits, making the outlook for the coming spring sowing much better than last year. Even with moderate winter precipitation shortfalls, soil moisture should be generally in good supply next spring.

Corn/soybeans: Above-normal rainfall in August and September alleviated soil moisture deficits in most of the western Corn/Soybean Belt. Drier weather beginning late in September allowed harvesting to progress more rapidly than normal. Fall plowing was also well ahead of schedule in all but some northern and eastern portions of the belt.

The outlook for 1981 is a little more variable than in recent years. In southwestern parts of the belt (as in eastern parts of the Wheat Belt), above-normal winter precipitation will be needed to replenish soil moisture before the spring growing season progresses too far. This is indeed quite possible, but subsoil moisture deficits are quite a bit greater here than a year ago. On the other hand, many northern and eastern parts of the belt have quite abundant soil moisture, so that even with less than normal winter precipitation, excessive water may cause problems for fieldwork next spring. To complicate matters further in these areas, more than normal plowing may remain to be done unless much more progress is made before soils freeze. Only in the unlikely event that the drier areas get precipitation and the wet areas do not, will moisture problems of one kind or another be avoided.

Water supply in the West: Water storage reservoirs in the West are fed by rivers which originate in mountainous terrain. Palmer Drought Index values are calculated for flatter agricultural land, so they may not always give an accurate indication of water supplies. The following comments are based on information provided by SNOTEL, a cooperative effort run by the Soil Conservation Service with the National Weather Service's Hydrologic Section.

Water supply prospects are excellent in the southwestern quarter of the United States. Colorado River reservoirs have maintained above-normal levels from heavy rains early this year. California water supplies range from twice normal in the south to normal in the north. The Columbia River Basin has not been so fortunate. Low reservoir levels of last year have carried over, and above-normal snowpack must accumulate in the mountains in order to replenish supplies.

International situations (based on data compiled at the NOAA/USDA Joint Agricultural Weather Facility through November 12, 1980)

The U.S.S.R.: Weather during the 1980 growing season was not favorable to agricultural production in European U.S.S.R. Cold and wet weather delayed planting and crop development over most of the region, but dry conditions stressed crops in parts of the Volga Valley. Grain yields were reduced, and delays in crop maturation interfered with fall plowing and sowing, exposed late-harvested crops to the onset of cold weather, and probably prevented much of the maize from maturing at all. Some small grains have not been harvested because of persistent wet weather, and fall sowing intentions were not fulfilled in the northwest. On the plus side, soil moisture in the major winter grain belt is in good supply. Although grains were sown a little late, they probably had time to develop sufficiently to resist winterkill before cold and snow moved in at the beginning of November. Conditions going into winter are much better than they were a year ago.

China : Abundant rainfall was the rule in most crop areas during 1980. Some minor deficiencies occurred in the north and in southeast coastal areas, but the excesses were more noteworthy. Near record flooding in the Yangtze Valley caused problems for many crops as they entered the latter stages of development in August. The rains left reservoirs full; but irrigation needs have remained relatively low. October precipitation, in contrast to last year, surged much above normal in the winter Wheat Belt. These late rains put the wheat in good condition as the dry winter season approaches.

India : A strong monsoon produced a good rice crop in 1980. Flooding of low fields was more than offset by benefits of the moisture to upland areas. An early withdrawal from the west and northwest left cotton and groundnuts short of late season moisture. In the northwest, conditions are favorable for winter grain germination in most areas, and abundant groundwater and reservoir supplies make the outlook much better than a year ago.

Europe-Canada : Weather earlier in the 1980 growing season was unfavorable for small grains in these areas; too wet in Europe and too dry in Canada. Conditions ameliorated during August, substantially improving final yields. October precipitation increased soil moisture supplies in both areas, with a tendency toward some excesses in Europe and some deficits in Canada.

Argentina : Most crop areas were relatively dry as the spring season began, putting some stress on winter wheat, especially in southwestern areas. In mid-October, the weather turned wetter in northern wheat areas, where maize and soybeans are also concentrated. The moisture is not beneficial to wheat which is nearing maturity, but conditions for corn and soybean planting have become much more favorable in recent weeks.

Brazil : Above-normal rainfall in the south is causing problems for mature winter wheat again this year. The rains have not been as intense as last year, but the persistent wet weather is not at all favorable to the crop. Conditions are good for soybean planting, which should be well along now. Soil moisture may be excessive in some parts of Rio Grande do Sul, but this is much preferable to moisture deficits, and some time remains before planting must be completed. It is difficult to be too optimistic, however, for these porous soils can dry out rapidly in the heat of summer.

SUBSISTENCE CROP ASSESSMENT TECHNIQUES

(By Louis T. Steyaert (NOAA/EDIS/CEAS), Malcolm Reid (NOAA/EDIS/CEAS), Paul F. Krumpe (USAID/OFDA), and Norton D. Strommen (WFAOSB/USDA))

The food supplies of many developing countries located in semi-arid, subtropical zones are highly vulnerable to climate anomalies such as large-scale drought. The success of crops produced by subsistence level agriculture in these regions is directly dependent on the magnitude, timeliness, and frequency of seasonal rainfall which can be quite variable. Vulnerability to climate can be compounded by increasing population pressure, diminishing natural resources, and land-management decisions which may be less than optimum.

Drought is a "creeping" natural disaster which can lead to abnormal food shortages and famine. Such drought-related food shortages frequently result in a request for international emergency relief assistance. The Agency for International Development, Office of U.S. Foreign Disaster Assistance (AID/OFDA) has the responsibility and mission of responding to such disasters and implementing actions of the United States to meet the needs for emergency assistance. To be most effective in accomplishing its mission, AID/OFDA requires an early warning system to provide information on potential needs prior to the actual occurrence of drought-related food shortages.

Because of these considerations, the NOAA/EDIS Center for Environmental Assessment Services (CEAS) was asked by AID/OFDA to investigate (1) early-warning procedures for disaster assistance needs associated with drought in developing countries, (2) relationships between large-scale circulation patterns and regional drought, and (3) the impact of deforestation and soil erosion in Haiti. The work described herein primarily includes analysis in the Caribbean Basin and sub-Saharan Africa.

This multidiscipline effort, initiated in 1977, is being conducted by the Climatic Impact Assessment Division (CIAD)-Models Branch located in Columbia, Mo., and the Climatic Assessment Branch (CAB) located in Washington, D.C. in cooperation with the University of Missouri at Columbia, Atmospheric Science Department.

The goals of the program include:

Providing AID/OFDA with qualitative weekly weather assessment reports on the impact of anomalous weather events and short-term climatic conditions in developing countries.

Developing an agroclimatic data base to investigate interrelationships among climate, agriculture, abnormal food shortages, and deforestation.

Developing a low-cost climate/subsistence food monitoring system to provide reliable early warning of potential food shortages due to drought.

The initial project (CEAS, 1979a), "A Study of the Caribbean Basin Drought/Food Production Problem," was completed in May 1979. Questions involving food security in Haiti were integral to this study. A second study (CEAS 1979b, "Development of Weather-Crop Relationships for Drought-Prone Countries of sub-Saharan Africa," was completed in July 1979. Climate/crop assessment procedures proposed by CEAS (1979a,b) for early warning of drought-related food shortages currently are in the final phase of test and evaluation, and are scheduled to be completed in December 1980. Aspects of these studies recently were discussed at the Conference on Climate and Risk by Strommen, Krumpe, Reid, and Steyaert (1980).

A current project, "Climatic Analysis and Development of Climate/Crop-Yield Models for Southeast Asia and the Indian Subcontinent" is scheduled for completion in May 1981. Two other projects involving analysis for developing countries in southern Africa and selected countries in Latin America are expected to begin during 1981.

For a given geographic region the above analysis can be subdivided into two broad phases. The developmental phase includes regular weekly weather assessment reports, acquisition of meteorological and other data, climatic analysis, and development of quantitative, early warning procedures based on climate/crop relationships. The test and evaluation phase is designed to refine, verify, and validate assessment procedures as well as complete the necessary documentation and computer software to make the system routinely operational.

WEEKLY WEATHER ASSESSMENT REPORTS

Qualitative, operational assessments are currently issued on a weekly basis for 26 climatic regions in the Caribbean Basin, 109 regions in Africa, and 107 regions in South and Southeast Asia. During the current period of test and evaluation for the Caribbean Basin and sub-Saharan Africa, these weekly assessments are supplemented with monthly qualitative crop condition assessments which are based on climate/crop yield models including agroclimate indices as discussed by CEAS (1979a,b).

Information sources for the climate/subsistence food monitoring system include surface weather observations, climatological normals, historical data, surface and upper air analyses, satellite imagery, and such ancillary information as abstracts from the New York Times information data base, USDA foreign attaché reports, and reports from the Foreign Broadcast Information Service.

In many regions which are highly prone to disastrous drought the availability of real-time precipitation data is quite limited either because of very sparse station density or due to missing reports. Therefore, a major function in support of AID is to estimate rainfall amounts within each agroclimatic region in order to assess areas of potential or ongoing drought. Surface- and upper-air weather analyses provided by NOAA/NWS are used to identify those regions in which atmospheric dynamics suggest the occurrence of precipitation. Additionally, satellite imagery from NOAA 6, TIROS, GOES, and DMSP weather satellites is also used as a tool to estimate precipitation.

Meteorological data are obtained by NOAA/NWS through the World Meteorological Organization's Global Telecommunications System from worldwide weather stations. Also, CEAS estimated precipitation data from satellite and ancillary sources are summarized on both a weekly and monthly basis. Additionally, anomalous weather events such as reports of extreme wind and precipitation totals are summarized on a daily basis to provide an episodal data for use in assessments.

Two examples of programs developed by CEAS to detect drought and flood areas are concerned with cumulative precipitation and percent of observations reporting precipitation. The cumulative precipitation program compares reports of weekly precipitation with respective normals and identifies "drought" as the occurrence of less than 60 percent of normal precipitation for a minimum of 8 consecutive weeks. Stations or agroclimate regions that fall below the 60-percent threshold for at least 8 weeks are continued in this "drought" category until sufficient rainfall occurs to raise the cumulative precipitation for the most recent 8-week period to at least 60 percent. A second component of this program is based on climatological normals and indicates the number of weeks of normal precipitation that would be required to alleviate the drought, that is, to raise the 8-week precipitation totals to at least 60 percent of normal. The percent of observations reporting precipitation program provides the weekly percentage of all weather observations within each agroclimatic region that report a weather event (snow, rain, hail, showers, etc.) which indicate that precipitation is occurring. This percentage is used in two ways: first, it is empirically related to historical quantitative precipitation amounts to provide an estimated precipitation, and second, it is compared with historical percentages to determine if reports of rainfall have been less than, near, or more than the usual percentages of normal.

CROP MODEL DEVELOPMENT

Climate/crop yield models are based on physical relationships between environmental data and crop response including plant-water requirements for each major growth stage. The crop-modeling system is designed to accommodate constraints which may include the limited availability of (1) both historical and real-time meteorological data, (2) reliable crop yield data, and (3) crop calendar information. Additionally, the system is broad enough to consider the type of crops which are produced, and yet sufficiently low-cost for practical operation.

In addition to these constraints, there are important considerations associated with subsistence agriculture, particularly in semiarid zones. For example, subsistence agriculture is based on "built-in" safeguards which tend to insure at least minimal returns except in the very worst of drought years. Agricultural practices such as multiple plantings over a 30- to 60-day period, the variety of crops grown, intercropping, and other distinctive cultural practices (for example, decisions on crop planting dates) must be considered in the development of the models. In spite of these constraints and considerations, some important assumptions can be made to develop crop yield models including agroclimatic indexes. Some of these include:

(1) Year-to-year variability in yield is largely due to variations in rainfall for a given region. In many cases soil fertility and crop variety act together as overall limiting factors.

(2) Analysis of cumulative precipitation has been demonstrated on an operational basis to be a practical indicator of climatic impact on crops.

(3) In the case of subsistence level farming, the level of technology is very low and relatively constant from year to year.

(4) Information on crop calendars and agricultural practices is generally available or can be inferred from agroclimatic analysis.

(5) Scientific studies are available to provide significant information on plant-water requirements by growth stage, climatic/crop relationships, and discussion of various types of crop modeling approaches.

(6) Verification and validation of crop indexes developed for data-limited regions can be partially accomplished by analysis of episodic data bases which include the various reasons for abnormal food shortages and/or famine.

Information on these factors permits the development of the appropriate hypothesis on which to base the model, for example, the time and space scale considerations for aggregating the data, selection of potential predictors, and the type of analysis.

Three approaches were used to develop indicators of subsistence crop productivity depending on the availability and reliability of yield data. These approaches included traditional regression type climate/crop yield model based on monthly data for regions with at least marginally reliable crop yield data, analog crop yield models, and agroclimatic indexes. In the second approach, traditional climate/crop yield models were used as analogs to regions to provide relative yield estimates. Analog regions were defined as having climatic conditions and cropping practices very similar to the country which had available climatic data but limited crop data.

Both analog yield models and agroclimatic indexes were used to generate historical, relative yield indexes from climatic data (that is, 1920-78 for the Caribbean Basin and 1950-77 for sub-Saharan Africa). Yield assessments are based on a comparison of the real-time estimates to historical indices which in some cases have been scaled according to the severity of known occurrences of abnormal food shortages and famine. In this respect historical climatic data, which are expressed as a crop index, are linked with socioeconomic data to determine the degree of food shortage, as well as antecedent conditions (both weather and nonweather factors) which tend to be associated with the food shortage.

TEST AND EVALUATION

Early warning assessment procedures developed by NOAA/EDIS/CEAS for the Caribbean Basin and sub-Saharan Africa are currently undergoing test and evaluation. The objective is to demonstrate the capabilities and limitations of the proposed system by verification of documented crop condition assessments against reliable reports from in-country. In this regard the models have been used to provide

qualitative crop condition assessment information which is incorporated on a monthly basis into routine weather assessments during the crop growing seasons of 1979 and 1980 for both regions.

Two methods of verification are currently being used. The first involves a qualitative evaluation of the 1979 and 1980 assessments by comparison with reports made by private volunteer organizations, the Food and Agricultural Organization of the United Nations, AID, and USDA. Documented reports of abnormal food shortages will be used to determine the timeliness and accuracy of assessment reports. The second method of verification involves a detailed comparison of historical crop indices with reports of famine and abnormal food shortages which have been reliably documented in the literature. This procedure also permits the determination of critical crop index values which tend to signal potential food shortages, as well as, the primary causes of food shortages.

Some brief comments on analysis for the Caribbean Basin and sub-Saharan Africa illustrate this method of verification.

The Caribbean Basin crop condition assessment issued at the end of December 1979, reported probable below normal crop conditions in southwest Haiti due to below normal moisture conditions during the critical reproductive growth stage for crops planted in the early fall. The May 1980, crop condition assessment provided a detailed analyses of the 1979 autumn crop season and noted the potential for abnormal food shortages in southern Haiti, particularly in light of abnormally dry spring conditions. The telegram, Amembassy Port-au-Prince R221507Z July 1980 noted that NOAA reports and analyses correspond generally to ground conditions, the existence of some food-for-work assistance in the south and on the Island La Gonave, and extended feeding of children beyond the school year in the Jeremie area. Attempts to further document and evaluate these assessments have been limited by the subsequent severe impact of Hurricane Allen in these regions.

Several examples of the link between drought and abnormal food shortages in Haiti during the past 30 years have been analyzed by Ravelo (1980a,b).

Monthly assessment reports were issued at the end of August, September, and October 1979, for countries in sub-Saharan Africa. The concluding remarks contained in the October 1979 report include:

October marks the end of the growing season in the Sahelian countries of Africa. The overall assessments of Sahelian agriculture are below normal in all countries. Seasonal rainfall for 1979 was below normal but not severely lacking; however, most crops were subject to water stress conditions during August from low rainfall. These moisture stress conditions during the reproductive stage may have seriously reduced crop yields and rangeland production. In general, there is a negative departure from 1978 crop conditions at all growth stages. The model yield estimates for selected crops ranked very low as compared with previous years.

Dale (1980) presents a detailed case study analysis of the 1979 growing season on a country-by-country basis. In general, very close agreement was found to exist between these crop assessments and FAO reports. Both provided very useful early-warning information on the potential for crop failure as early as the end of the vegetative growth stage, some 60 days prior to harvest in 1979. Comments received from FAO also indicate the favorable comparison between the two systems for 1979.

The final report for the test and evaluation phase will include detailed analysis of 1979 and 1980 seasons. Particular emphasis will be placed on the well-documented food shortages which are currently being experienced in sub-Saharan Africa.

CONCLUDING REMARKS

The results have been very promising. In general, this type of analysis can be expected to provide useful information by about 30-60 days prior to harvest of the crop. The literature search indicates that abnormal food shortages may not actually occur until 3-6 months after harvest. Although this system is only designed to assess the impact of climate, it is believed that the system will allow AID/OFDA to achieve a more cost effective response capability in meeting the following goals:

Monitor and assess to the fullest extent possible, all potential and actual disaster situations due to drought in developing countries.

Increase the U.S. technical capacity to define disaster-prone conditions and to recommend disaster-avoidance measures.

Apply and transfer both technology and information to developing countries, international organizations and others to insure maximum possible leadtime and warning of these potential disasters.

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NEW FARM SECTOR ACCOUNTS

(By Allen Smith, Economics and Statistics Service, U.S. Department of Agriculture)

The U.S. Department of Agriculture has published a comprehensive set of income estimates relating to agriculture for more than 50 years. The series have been revised and expanded through time, incorporating individual State estimates in 1949 and sales class distributions in 1960.

Revisions in the format of the farm sector accounts which were formerly published in the "Balance Sheet of the Farming Sector" and "Farm Income Statistics" mark another step forward. About 2 years ago, a research project was initiated to review and implement where possible the recommendations of two task force reports on farm financial accounts. The revised accounts discussed here are the result of this 2-year effort.

The data and information programs in place today originated in the 1940's when more than 5 million farms, mostly small, family operations depended almost entirely on farming as their source of income. The early data collection efforts were primarily designed to provide information about the farm sector as an aggregate unit. With relative homogeneity within the sector, aggregate measures can be related to the well-being of the component parts. However, the fundamental character and structure of agriculture have increasingly departed from homogeneity. As a result, the economic accounts and information systems built in the absence of structural considerations are increasingly ineffective in providing insight into the true financial well-being of the various subpopulations that make up today's changing farming sector. In some years, there is an apparent paradox of sharply rising total and average farm income while the economic condition of some groups of farmers producing certain crops and livestock has not improved. Better information is needed to more correctly interpret the actual economic conditions of various subgroups of farmers.

The revised accounts discussed here were developed for two important reasons: first, to separate the aggregate accounts in a manner that would permit the earnings of the farm business unit to be distinguished from farm family income, and second, to permit a better analysis of the wealth and income status of the production units and the operators of those units, by type of farm, value of sales class, and type of ownership.

The new accounts are based on the concept of separating the measurement of the economic viability of the production units (establishments) of the farm sector (a part of the business sector of the national economy) from the well-being of the farm operator families (a part of the household sector of the national economy).

The newly developed farm sector accounts will be published in a series of statistical reports entitled "Economic Indicators of the Farm Sector." The first of these will be published in December and will contain national income and balance sheet statistics under the new accounts, in addition to the traditional statistics as formerly published in the "Balance Sheet of the Farming Sector" and "Farm Income Statistics."

Publication of these accounts this fall marks the first step in a long-term program of developing and implementing more comprehensive and informative measures of the economic performance of the production units and well-being of the operators in the farm sector. Important aspects of this upgrading process are identifying and collecting data which will provide more meaningful information in future years on farms by type, size, location, ownership, and other groupings.

STRUCTURE OF THE NEW ACCOUNTS

The new income and balance sheet accounts separately report the financial condition of the farm sector from the income and wealth of farm operator families. This permits clearer distinction between the economic status of the farm production establishment versus that of operator households. This separation will be especially useful for analysis at the economic sales class and type of farm level. Some small farms, for example, may not be viable units from a farm production standpoint, but the operator household may have a satisfactory income when off-farm income is combined with farm income.

The agricultural production sector includes farm establishments involved in agricultural production regardless of the source of labor. The production sector is separated from the marketing, processing, and distribution sectors within agriculture and can be subdivided according to geographic location, type of ownership, and type of farm (cash grain, livestock, tobacco, et cetera). Disaggregation of the production sector according to business organization would include sole proprietors, partnerships, and corporations.

Plans are now in process to secure information by type of farm, type of organization, and more complete information by value of sales class. The 1978 Census of Agriculture will provide additional information for these classifiers. New questions have also been added to the 1981 Farm Production Expenditures Survey to provide cross tabulations by the above classifiers. Modifications in the 1982 Census of Agriculture are also being discussed to provide more information to support these changes.

The terms farm and establishment represent the places on, or in, which the production process occurs. The establishment concept used in the new farm sector measures is the official census farm definition adopted in 1974 which includes places with annual sales, or potential sales, of \$1,000 or more.

Households include all families or individuals receiving income from the agricultural production sector. The main category of households emphasized in the new sector accounts is farm operators. The operator category includes owners, tenants, and managers associated with corporate or institutional establishments.

COMPARISON OF ORIGINAL AND REVISED ACCOUNTS

The major differences between the revised format of the new accounts and the original accounts are summarized in tables 1 and 2. Details of the balance sheet statistics are given in table 3, income statistics in table 4, and cash flow in table 5.

The new accounts basically differ from the original accounts because the household portion of wealth and income are removed. In the revised balance sheet accounts, the operators' dwellings are removed from real estate assets and real estate debt, and the household portions of automobiles and trucks are removed from the machinery and motor vehicles accounts. Household equipment and associated debt are also removed from the balance sheet accounts. The financial assets retained are those considered part of the farm business; namely, currency, demand deposits, and investment in cooperatives.

As shown in table 1, the net result of these changes in balance sheet items on January 1, 1980 is a reduction in total farm assets from \$918.9 billion to \$821 billion. The percentage increase from 1978 to 1979 was 14.8 percent for the revised accounts and 14.2 percent for the original accounts. Total farm debt in the original account was \$157.3 billion, up 15.6 percent from 1978. After excluding operators' households, total debt was \$146.4 billion up 15.5 percent from 1978.

TABLE 1.—COMPARISON OF REVISED AND ORIGINAL FORMATS FOR BALANCE SHEET STATISTICS, JAN. 1, 1980
[Millions of dollars]

Item	Jan. 1, 1980, revised format ¹	Jan. 1, 1980, original format ²
Assets:		
Total farm assets.....	820,972	918,861
Real estate.....	613,653	671,243
Livestock and poultry.....	61,243	61,243
Machinery and motor vehicles.....	88,415	94,322
Automobiles.....	2,042	6,380
Trucks.....	6,689	8,258
Tractors.....	26,844	26,844
Other machinery.....	52,840	52,840
Crops.....	33,094	33,094
Financial assets.....	24,567	38,499
Time deposits.....	(3)	8,580
Currency.....	1,888	1,888
Demand deposits.....	5,396	5,396
Investments in cooperatives.....	17,283	18,600
U.S. savings bonds.....	(3)	4,035
Household equipment.....	(3)	20,460
Claims:		
Total farm debt.....	146,440	157,323
Real estate.....	74,983	82,123
Nonreal estate.....	71,457	75,200
Commodity Credit Corporation.....	4,500	4,500
Other reporting institutions.....	55,465	58,980
Nonreporting creditors.....	11,492	11,720
Proprietors' equity.....	674,532	761,538

¹ Excludes operators' dwellings and other assets and debts associated with family use.

² As previously published in the Balance Sheet of the Farming Sector.

³ Not applicable.

TABLE 2.—COMPARISON OF REVISED AND ORIGINAL FORMATS FOR 1979 INCOME AND EXPENSES
[Millions of dollars]

Item	1979 revised format ¹	1979 original format ²
Income:		
Farm marketings.....	\$132,399	\$131,459
Livestock and products.....	68,639	68,639
Crops.....	63,760	62,820
Net inventory change.....	2,874	4,068
Government payments.....	1,375	1,375
Value of home consumption.....	1,447	1,447
Rental value of farm dwellings.....	(3)	9,104
Other farm income.....	2,323	2,124
Total.....	140,418	149,577
Expenses:		
Feed.....	17,004	17,004
Livestock.....	12,684	12,684
Seed.....	3,400	3,400
Fertilizer and lime.....	6,692	6,692
Pesticides.....	3,057	3,057
Fuel and oil.....	6,281	6,281
Electricity.....	1,639	1,639
Repair and operation.....	6,938	7,384
Machine hire, custom work, and contract labor.....	4,078	3,165
Wages to hired labor.....	8,327	9,239
Marketing charges.....	1,767	1,767
Other expenses.....	4,382	4,937
Interest.....	12,281	12,836
Real estate.....	5,708	6,260
Nonreal estate.....	6,576	6,576
Business taxes.....	3,943	4,259
Capital consumption.....	16,181	18,954
Net rent to landlords.....	6,032	5,320
Total.....	114,696	118,618
Returns to operators.....	25,722	(3)
Net farm income.....	(3)	30,959
Operators' income:		
Farm sources.....	30,706	30,959
Total.....	34,362	34,362
	65,068	65,321

¹ Excludes income and expenses associated with the operators' dwellings. Considers CCC transactions as loans rather than cash receipts.

² As previously published in Farm Income Statistics.

³ Not applicable.

The revised income account mainly differs from the original net farm income account in two ways. Household income and expenses are removed, as in the balance sheet accounts, and Commodity Credit Corporation (CCC) loans are treated as loans and not as commodity sales as they were in the net farm income account. As shown in table 2, gross farm income in 1979 totaled \$149.6 billion under the net farm income account. The revised income account indicates total income of \$140.4 billion. The difference is primarily because the rental value of farm dwellings is excluded from the new income account except for the rental value of hired labor dwellings, which is added back into other farm income.

Crop cash receipts and the value of the change in inventories is also changed because CCC stocks are treated as loans rather than sales in the new account. In 1979, crop receipts are greater under the new format because CCC stocks were lower than 1978, thus reducing crop receipts under the net farm income account. However, this increase was more than offset by a lower inventory value reflecting the net reduction in CCC stocks valued at the higher market prices rather than loan price.

Production expenses totaled \$118.6 billion in 1979 in the net farm income account and \$114.7 billion under the revised format primarily because expenses on the operator dwelling are removed. Rent to landlords is higher under the new income format because rent to all landlords is included while under the original accounts only rent to nonoperator landlords was included.

The relevant income measure under the new income account is called returns to operators, which totaled \$25.7 billion. This was \$5.3 billion lower than the \$31 billion of net farm income in 1979. This difference largely reflects the exclusion of about \$9 billion of imputed income from the gross rental value of farm dwellings along with a reduction of about \$4 billion in expenses associated with operator dwellings.

DESCRIPTION OF THE NEW ACCOUNTS

Tables 3, 4, and 5 are summary tables which provide an overview of the balance sheet, production transactions, and cash flow statistics which will be presented in the new sector accounts.

Balance sheet

Table 3 summarizes several overall measures of the farm sector's financial status. The financial summary relates to balance sheet accounts and includes assets, debts, and equity under the revised format where the operator and household assets are removed from the accounts as described earlier. Balance sheet items are reported as of January 1 each year.

TABLE 3.—SUMMARY OF THE FARM BALANCE SHEET, JAN. 1, 1977-80

[Dollar amounts in billions]

Item	1977	1978	1979	1980 ¹
Assets:				
Total farm assets ²	\$566.3	\$617.0	\$715.2	\$821.0
Real estate ³	431.1	468.5	535.1	613.7
Livestock and poultry ⁴	29.0	31.9	51.3	61.2
Machinery and motor vehicles ⁵	64.1	70.3	78.7	88.4
Crops ⁶	22.0	24.9	27.4	33.1
Financial assets.....	20.1	21.3	22.8	24.6
Claims:				
Total farm debt.....	95.4	111.2	126.8	146.4
Real estate ⁷	51.5	58.1	64.6	75.0
Nonreal estate ⁸	42.9	48.6	56.9	67.0
CCC loans ⁹	1.0	4.5	5.2	4.5
Equity.....	470.8	505.7	588.4	674.5
Percent:				
Financial indicators: Change during year in—				
Assets.....	9	16	15	(10)
Debt.....	17	14	15	(10)
Equity.....	7	16	15	(10)
Ratios:				
Equity/assets.....	83	82	82	82
Debt/equity.....	20	22	22	22
Debt/assets, total.....	17	18	18	18
Debt/assets, real estate.....	12	12	12	12
Debt/assets, nonreal estate and CCC.....	33	36	35	34
Returns to operator/total debt.....	13	17	18	(10)

¹ Preliminary.

² Excludes value of operator dwellings.

³ Excludes horses, mules and broilers.

⁴ Includes only farm share value for trucks and autos.

⁵ All crops held on farms including crops under CCC and crops held off farms by farm operators.

⁶ Excludes debt on operator dwellings.

⁷ Excludes debt for nonfarm purposes.

⁸ Nonrecourse Commodity Credit Corporation.

⁹ (CCC) loans secured by crops, and storage and drying facilities owned by farmers.

¹⁰ Not available.

The summary of the farm balance sheet in table 3 differs from the summary formerly presented in the "Balance Sheet of the Farming Sector" in that the operator's dwelling, household equipment, household share of trucks and autos, time deposits and savings bonds, debt on the dwelling, and household share of the non-real-estate debt are removed (see comparisons in table 1).

Thus, real estate assets are \$57.6 billion lower in the revised accounts. Machinery and motor vehicle value decreased nearly \$5.9 billion. Financial assets under the revised accounts were \$24.6 billion, down \$13.9 billion because time deposits and U.S. savings bonds, considered operator family household assets, are dropped, and investments in cooperatives are reduced by the household portion.

Real estate debt declined more than \$7 billion after the operators' dwelling portion of the debt was removed. Non-real-estate debt decreased by \$3.7 billion after household associated debt is removed from the revised accounts. Proprietor's equity, the difference between assets and debts, decreased \$87 billion under the revised accounts (see table 1). Several financial indicators and ratios are shown in table 3 to measure relative change in the balance sheet.

Farm production transactions

The objective of the transaction account (table 4) is to measure the income from agricultural production establishments such that the value added by the farm production sector can be distributed to the institutions or classes of individuals, such as sole proprietors, partnerships or corporations controlling the sector's resources. The account depicts the income producing process as a series of transactions including various sources of receipts and allocations of expenses.

TABLE 4.—FARM PRODUCTION TRANSACTIONS, 1977-79

[Dollar amounts in millions]

Item	1977	1978	1979
Gross receipts of farms.....	\$101,582	\$118,942	\$140,418
Farm marketings ¹	92,124	112,487	132,399
Crops.....	44,700	53,448	63,760
Livestock and products.....	47,425	59,038	68,639
Net inventory change ²	4,610	174	2,874
Government payments.....	1,819	3,030	1,375
Other farm income ³	1,728	1,874	2,323
Value of home consumption ⁴	1,301	1,378	1,447
Nonfactor payments.....	67,640	74,994	88,048
Intermediate product expenses.....	50,877	56,961	67,923
Capital consumption ⁵	13,114	14,312	16,181
Business taxes.....	3,650	3,721	3,943
Factor payments.....	33,942	43,948	52,370
Interest.....	7,943	9,566	12,284
Nonreal estate.....	3,971	4,902	6,576
Real estate.....	3,971	4,664	5,708
Wages to hired labor.....	7,038	7,289	8,327
Net rent to all landlords.....	4,606	5,508	6,037
Returns to operators.....	14,356	21,585	25,722
Total operator income.....	43,593	54,666	65,068
Farm sources ⁶	18,197	25,825	30,706
Returns to operators.....	14,356	21,585	25,722
Imputed net rental value of operator dwellings.....	3,294	3,584	4,267
Net rent to operator landlords.....	548	656	717
Off-farm sources ⁷	25,396	28,841	34,362

See footnotes at end of table.

TABLE 4.—FARM PRODUCTION TRANSACTIONS, 1977-79—Continued

Item	1977	1978	1979
Transactions indicators (percent):			
Farm marketings/gross receipts.....	91	95	94
Intermediate product expenses/gross receipts.....	50	48	48
Factor payments/farm marketings.....	37	39	40
Farm production indexes:			
Output (1967=100).....	119	122	129
Inputs (1967=100).....	105	105	108
Output/input ratio.....	113	116	119
Farm price indexes:			
Prices received.....	183	210	241
Prices paid, interest, taxes and wages.....	202	219	250
Prices received/paid ratio.....	91	96	96

¹ Does not include Commodity Credit Corporation (CCC) loans.

² Includes CCC stocks at market value.

³ Includes machine hire, custom work, recreation income and rental value of hired laborers' dwellings.

⁴ Includes consumption by resident employees.

⁵ Depreciation and accidental damage.

⁶ Includes operators' families, corporations, and other farm operator institutions.

⁷ Income of operator families only.

In the transactions summary, gross receipts are \$140.4 billion for the revised format compared with \$149.6 billion for the net farm income account (table 2). Total receipts differ because net rental value of farm dwellings are removed and CCC loans are treated as loans rather than cash receipts. However, CCC stocks are calculated as part of the inventory change in the new accounts.

Farm marketings increased in 1979 by nearly \$1 billion using the new methodology (table 2) because of a decrease in total outstanding CCC loans of \$940 million. Under the revised accounts, CCC loans are treated as loans and not sales as under the original accounts. Livestock marketings are the same in both accounts. Stocks of CCC loans become a part of inventory change, however. Thus, net inventory change dips from \$4.1 billion in the net farm income account to \$2.9 billion in the returns to operator account because the volume of CCC stocks were reduced at the end of the year. The reduction is greater than the \$940 million because CCC stocks are valued for inventory change at the average annual market price, not at the loan price.

Government payments and the value of home consumptions are the same in both income accounts. Net rental value of farm dwellings is not included in the farm sector under the revised set of accounts, but goes into the household sector as operator income. Other farm income is slightly larger in the new income account because the rental value of farm laborer occupied dwellings are added back in.

Intermediate product expenses is a new term which refers to purchased inputs. In the expense category, capital consumption is depreciation and accidental damage, the same concept as under the old accounts, but is lower under the revised format because the operator dwelling and household portion of the assets such as motor vehicles are removed.

Depreciation in both accounts is measured on a replacement value basis rather than purchase price to reflect decreases in current market value of the capital stock. Business taxes, which include both real estate and personal property taxes, drop from \$4.3 billion in the net

farm income account to \$3.9 billion in the revised format and capital consumption falls from \$19 billion to \$16.2 billion (table 2).

Another new term is factor payments. The value shown is the income available to provide returns to the factors—land, labor, and capital. These returns are interest, wages to hired labor, net rent to all landlords, and returns to operators. No term in the net farm income account is comparable to factor payments. Real estate interest is lower in the revised format because the dwelling portion of the debt is removed. Wages to hired labor drop from \$9.2 billion to \$8.3 billion because \$900 million of contract labor has been transferred to services hired (machine hire, custom work, and contract labor). Net rent to landlords in the new format is \$6 billion compared with \$5.3 billion in the net farm income accounts. This is because the net farm income account only included nonoperating landlords while the new account includes operating as well as nonoperating landlords.

The new term "returns to operators" is the residual return to the operator and is the return for labor, management and capital supplied. Returns to operators were \$25.7 billion in 1979 under the new income account compared with net farm income of \$31 billion under the original format. In 1979 both net income measures were 19 percent larger than 1978.

Total operator income includes farm and off-farm income. Farm-associated income includes income from farming, rental value of operator dwellings, and rent received by operator landlords. The net rental value of operator dwellings was included in net farm income under the former concept, but the rental value is removed from return to operators. Rent to operator landlords is removed as an expense in returns to operators, but is also included under total income of the operator. Total off-farm income includes income from off-farm activities such as wages and salaries, nonfarm businesses, interest, dividends, rents, and transfer payments. Off-farm income is the same for both the new and original accounts.

Total operator income in 1979 of \$65.1 billion includes \$30.7 billion from farm sources and \$34.4 billion from nonfarm sources under the revised accounts. The original accounts had total operator income of \$65.3 billion, \$31 billion from farm sources and \$34.4 billion from nonfarm sources as shown in table 2.

Farm sector cash flow

An indicator which helps provide some perspective on the shortrun financial situation of farmers is their cash flow status. Even though the wealth and income situation of the average farm operator may be adequate in terms of the farmer's resources, the cash flow may be inadequate to meet current obligations, thus causing financial difficulties. This may not be unusual, for example, for many beginning farmers and for those who may have recently purchased land financed at interest rates which in periods of unfavorable price relationships could cause severe stress on the farm firm.

The farm sector cash flow account includes only cash transactions (table 5). Net inventory change, perquisite rent, and home consumption are not cash items and are removed from gross income to get cash income. Cash uses include only those expenses that are cash payments.

Capital consumption is a noncash expense and it is not included. The perquisites for hired labor are also excluded. Cash income from farming measures the cash available for capital asset purchases, loan retirement, and operator household cash income.

The cash flow summary includes other sources of cash including CCC loans, net changes in real estate and non-real estate farm business loans, and the net change in farmers' currency and demand deposits. However, capital expenditures are a cash use and are subtracted since they decrease the cash available. Net cash flow measures that change in cash available for household consumption, further business operations, or purchases of real estate from discontinuing proprietors.

Cash income from farming was \$38 billion in 1979 compared with net farm of \$31 billion and returns to operators of \$25.7 billion. This cash income measure shows a somewhat different pattern of change over the past 3 years than net farm income or returns to operators. For example, cash income from farming in 1979 was up only 9 percent from 1978 while net farm income and returns to operators both increased 19 percent. In 1978, however, cash income from farming increased more than net farm income or returns to operators.

TABLE 5.—FARM SECTOR CASH FLOW, 1977-79

[In millions of dollars]

Item	1977	1978	1979
Cash transaction summary:			
Cash sources	95,504	117,219	135,899
Farm marketings	92,124	112,487	132,399
Crops	44,700	53,448	63,760
Livestock and products	47,425	59,038	68,639
Government payments	1,819	3,030	1,375
Other farm cash receipts ¹	1,561	1,702	2,125
Cash uses	73,550	82,466	97,854
Intermediate product expenses	50,877	56,961	67,923
Farm origin	23,992	27,497	33,088
Manufactured inputs	13,562	14,658	17,671
Other	13,323	14,807	17,161
Business taxes	3,650	3,721	3,943
Interest	7,943	9,566	12,284
Cash wages to hired labor ²	6,475	6,710	7,666
Net rent to all landlords	4,606	5,508	6,037
Cash income from farming ³	21,954	34,753	38,045
Cash flow summary:			
Cash income from farming ³	21,954	34,753	38,045
Change in loans outstanding ⁴	15,784	15,582	19,638
Real estate loans	6,584	6,532	10,370
Nonreal estate loans (excluding CCC)	5,723	8,297	10,010
Commodity Credit Corporation	3,477	753	-742
Net change in farmers' currency and demand deposits	88	102	147
Net rent to all landlords	4,606	5,508	6,037
Less: Capital expenditures	16,756	17,942	19,869
Net cash flow ⁵	25,676	38,003	43,998

¹ Machine hire and custom work and recreational income.² Wages from table 4 less perquisites.³ Cash available to farms for payment of asset purchases, loan retirement, and operator cash income. This income is supplemented by loans including CCC loans.⁴ From table 3.⁵ Change in cash available for operator income and real estate purchases.

SOIL AND WATER RESOURCE CONSERVATION OUTLOOK FOR THE EIGHTIES

(By Ned D. Bayley, Acting Assistant Secretary for Natural Resources and Environment, U.S. Department of Agriculture)

I am a long-term admirer of this Department's outlook conferences, and of the people within and outside USDA who give considerable effort to preparing for them and spreading the good ideas from them.

Any agricultural outlook depends not only on economic, physical resource, and production trends but also on policy issues and shifts. Your strong emphasis on policy directions recognizes this fact. I hope my exploration of soil and water resource conservation issues will provide some additional insight into the agricultural outlook for the 1980's.

Let me say at the outset that I am unabashedly proud of American agriculture and of the people, resources, and technology that make it work.

Many factors have been responsible for this record. Chief among these is that we have some of the best soil in the world and some of the world's most favorable climate for growing crops and livestock.

We did not make the soil or the climate—our ancestors found them here.

And our ancestors—and we, their progeny—have taken full advantage of these great gifts to build a strong nation and a better world.

Some 50 years after the American Revolution, the French historian Alexis de Tocqueville visited the United States and made this observation about the new Nation:

The country is limitless and full of inexhaustible resources. * * * No other Nation has made as rapid progress as the Americans. They arrived but yesterday, and they already have turned the whole order of nature upside down to their profit.

Until recently, most Americans shared de Tocqueville's view of our country's "inexhaustible resources."

Today, however, as we begin our third century as a nation, we have learned the hard way that there are limits to our natural resources, limits to the ways we can treat them, limits to the degree to which we can "turn the whole order of nature upside down." Our natural resources, although clearly among the best in the world, are finite * * * are vulnerable.

In discussing the limits and vulnerability of our resources, I will present two sets of policy issues that face us in the 1980's. One set deals with the condition of our natural resources. In the interest of time, I will concentrate on soil with some mention of water.

The second set of issues will address the major program approaches that must be considered as we develop Federal, State, and local responses to conservation needs. These approaches are being developed as part of the process required by the Soil and Water Resources Conservation Act, generally known as RCA.

Let's first look at the use of soil resources in the United States.

USES OF LAND

Roughly two-thirds of the land area of the United States—about 1.5 billion acres—is non-Federal land. It encompasses private land, including farms and ranches, Indian lands, and land belonging to State and local governments. Of the total non-Federal land, 36 percent or 541 million acres is classified as pastureland, native pasture, or rangeland. Cropland use makes up 27 percent or 413 million acres. Forest land covers 25 percent or 370 million acres. Other uses, including urban development, highways, airports and utility corridors, make up the remaining 12 percent or 176 million acres.

These figures are not static—rural land use shifts back and forth regularly. For example, between 1967 and 1975, millions of acres went from crops to pasture, and millions more from pasture to crops. In that period, trees were felled on 11 million acres to make way for cropland, while millions of acres of cropland reverted to forest. In each of those years 3 million acres of rural lands were shifted irreversibly to urban uses or water storage. Included in that 3 million acres was some of our best farmland, which is especially vulnerable because it is equally suitable for competing uses—housing, transportation, and other “improvements.” For more than a decade, 1 million acres per year of good farmland has shifted forever to these other uses.

SOIL EROSION

To develop a useful outlook on the state of our Nation's soil and water resources, we must look beyond classifying land by acreages, by uses, and by shifts in uses. We must look at the very condition and availability of the soil itself, and examine the degree to which it is eroding or being protected from erosion and the impacts this erosion has on soil and agricultural productivity.

The Soil Conservation Service has established soil loss tolerance values for the various soils across the Nation. Called T-values for short, soil loss tolerance values represent the maximum rate of soil loss that can be tolerated and still sustain the inherent productivity of the soil. T-values are measured in tons per acre per year and range from 2 to 5 tons for specific soils under specific uses.

Soil with deep favorable subsoils are assigned a T-value of 5; soils with thinner and/or less favorable subsoils have T-values less than 5. Those soils with T-values below 5 often experience a greater proportionate loss of productivity from erosion than the deeper soils. Of the 138 million acres of cropland with T-values below 5, a total of 57 million acres, or 41 percent is currently eroding at excessive rates.

T-values help us estimate the extent of our soil erosion, where we have the most serious erosion problems, and where we have the least

erosion. Sheet and rill erosion generally is most severe for row crops. In 1977, excessive rates of erosion on all croplands, from all types of erosion, equaled about 2.3 billion tons; one-fourth of this erosion occurred on land planted to corn. Next in order of contribution to excess erosion were the acres planted to soybeans, wheat, cotton, sorghum, and in summer fallow. On a per-acre basis, however, sheet and rill erosion generally is worst for areas planted to soybeans.

Significant soil erosion problems occur in most of the States. Sheet and rill erosion is greatest in the Appalachian, Corn Belt, Delta, and Southeast regions. In five States, mostly in these regions, and in the Caribbean area, average erosion rates exceeded 10 tons per acre per year. Nineteen other States, again mostly in these regions, suffered excessive soil rates of 5-10 tons per acre per year. In addition, the Great Plains area has serious wind erosion problems, especially in the States of Colorado, New Mexico, and Texas. It should be noted, however, that the specific sites of high risk that are now suffering excessive erosion are not areawide or even countywide. They tend to be localized within subareas and even within individual farms.

Demand/supply influences on erosion.—Growing demands for food and fiber can influence the extent of soil erosion. In response to these demands, acreages planted to crops (excluding very minor crops) have increased from nearly 299 million acres in 1969 to about 364 million acres in 1980. Over two-thirds of the acreage expansions between 1969 and 1980 occurred in the Appalachian, Corn Belt, Lake States and Northern Plains regions. Row crops increased by 49.7 million acres of which about 79 percent occurred in these same four regions.

Wheat acreage increased nationally by 27 million acres, more than half of which occurred in the Northern and Southern Plains. This expansion of cropland has been occurring in areas known for serious erosion problems, and suggests a resultant increase in soil erosion.

There is also some direct evidence that soil erosion increased during the 1970's. For example, in the highly erosive area of western Iowa, a series of soil erosion studies found that average annual soil losses per acre dropped from 21.1 tons in 1949 to 19.5 in 1951 and then to 14.1 in 1957. In the early 1970's, however, the downward trend was reversed. In 1974, annual losses increased to 17.2 tons per acre per year, 22 percent over 1957. Other authoritative writers believe that similar patterns characterize much of the Corn Belt and perhaps other areas of the Nation.

Rising demands for food and fiber are predicted during the decade of the 1980's and could further aggravate current soil erosion problems. These demands are expected to be especially strong after the initial years of the 1980's when world economic growth rates are expected to surge up from current slower trends. Strong global food demands will provide price incentives for producers to expand crop production through intensified management of cropland already in production and by bringing additional lands into production, a continuation of the process underway since 1972.

SOIL PRODUCTIVITY

We cannot precisely describe the effect that soil erosion has on agricultural productivity, because there are so many variables. There is

considerable research, however, which suggests that excess erosion (rates which exceed T-values) significantly impairs soil productivity and that erosion increases costs to agricultural producers. However, these costs have been masked by the increased use of new agricultural technology in crop production. Technology has offset the production loss as a result of excessive erosion and also has given us higher yields beyond the offset level. Also, the extent to which demand-induced pressures on the land resource can aggravate the erosion problem is largely dependent upon the rate at which use of new technology increases crop yields.

RCA studies show, for example, that a 50-percent reduction in the current rate of soil erosion can be accomplished economically without significantly affecting the cost of food and fiber. This could occur even if crop yields increase no faster than current trends. However, if we had some significant research breakthroughs which would lead to faster increases in crop yields, we could still reduce erosion by 50 percent without increasing food costs and meet demands for food and fiber that exceed our projections.

On the other hand, even with accelerated increases in crop yields, reducing gross soil erosion beyond 50 percent does not appear to be economically sound because of the high cost of applying conservation measures. If the Nation were to seek erosion reduction by more than 50 percent, it would have to be justified on the basis of values other than economic ones, such as increasing the long-term productive capability of our soil, reducing uncertainty about meeting future food and fiber demands, or improving water quality through control of runoff.

RCA studies also provide helpful information about cropland supplies. For example, if future demands for food and fiber are in line with current trends, permanent losses of cropland will have little effect on long-term costs of production. These cropland losses, however, could have serious impacts on the economies of local farming communities. California citizens, as well as others, currently are struggling to deal with this problem.

On the other hand, if future demands exceed current trends by as much as 30 percent or if crop yields should fall off sharply, we might be short of cropland by the year 2030. In either circumstance a substantial acreage of land now in pasture, range, or forest would have to be converted to cropland. Some of these acres would suffer high erosion rates or produce low crop yields.

Such an extreme level of demand is not out of the question. During the past few years exports of agricultural products from the United States have exceeded previous long-term projections by more than 50 percent.

What about water resources? The United States receives an average of about 30 inches of precipitation each year—excellent for agriculture and all other uses. The trouble is that few places receive the average—the range is from 4 inches a year in the Great Basin to more than 200 inches along the Pacific Northwest coast. Agriculture is far and away the Nation's biggest water consumer, accounting for about 83 percent of total water use. In many parts of the West, there is inadequate surface water to meet the demands of agriculture and

other users. In 1975, ground water accounted for nearly one-fourth of the freshwater consumed in the United States, with agriculture using half of the total. Some 45 million acres of farmland is irrigated—up from 33 million acres in 1959.

Yet ground water is replenished slowly—and in several States the withdrawal is in the billions of gallons per day. This so-called “ground water mining” is depleting the Nation’s water supplies at the rate of 21 billion gallons per day. Already farmers in the Great Plains are experiencing reduced supplies from their wells. Some are able to change to crops which require less water. But what are farmers to do where dryland farming is not very productive?

These natural resource issues I have presented about soil erosion, soil productivity, and water supply are only examples of those America faces or will face in the next 50 years. There are equally compelling concerns about water quality, fish and wildlife habitat, upstream flood damages, energy production and use, organic wastes, and other related areas.

RCA

Because of their awareness of these issues the Congress, Government agencies, and citizens are beginning to suggest that we cannot rely on today’s policy prescriptions to solve agricultural and resource management problems of tomorrow.

Late in 1977, the Congress passed the Soil and Water Resources Conservation Act (RCA). This act represented consensus that it was time for a fresh look at the U.S. Department of Agriculture’s approach to soil and water conservation. The present form of soil conservation programs had its roots in the crisis of the 1930’s, in days of depression and the Dust Bowl. The pattern established then—a flexible program based on the voluntary cooperation of land users—has changed but little for more than 45 years. It continues to be a mixture of Federal, State, and local activities, with conservation objectives set by local conservation districts and farmer committees and with most of the funding coming from the Federal Government.

Today there are 34 programs administered by USDA agencies that relate in some way to soil and water conservation. There also is some type of State soil conservation agency in all 50 States, Puerto Rico, and the Virgin Islands. There are 2,950 local conservation districts established under various State laws. In every county, there also is a farmer-elected committee established under the Soil Conservation and Domestic Allotment Act. Finally, there are more than 2 million people cooperating in conservation programs by applying conservation practices on their land.

In passing the RCA, the Congress was not necessarily saying that these conservation programs in USDA were outmoded or unworkable. It was saying that after more than four decades of experience, we were overdue for a careful look at present resource conditions and the future course of soil and water conservation in the United States. Accordingly, the RCA directs the Secretary of Agriculture to:

Appraise on a continuing basis, the soil, water, and related resources on non-Federal lands of the Nation;

Look at what has worked best, what can work better, and what is not working;

Report findings and recommendations to the Congress and the public in 1980;

Provide the Congress with annual evaluation reports; and
Repeat the process in 1985.

The act calls for developing the appraisal and program in cooperation with conservation districts, State soil and water conservation agencies, other local and State agencies, individuals and citizen groups.

The overall objective of the RCA program we are developing will be to assure the natural resources needed by future generations of Americans for food and fiber, environmental quality, water and energy, fish and wildlife, recreation, and for satisfying community needs. In addition to this overall objective, we are developing 50-year objectives for each of seven major resource areas.

Stated briefly, here are the 50-year objectives we are presently considering:

Control erosion, giving emphasis to economic benefits to the land-owners and to society. We believe such an objective will achieve non-degradation of soil resources.

Help States meet standards in their water quality management plans, giving priority to areas where agricultural nonpoint source pollutants pose a threat to agricultural production and human health.

Minimize irrigation water use; reduce ground water withdrawals where water tables are falling; conserve water to protect in-stream uses, and optimize the efficiency of water use from natural sources for agriculture.

Protect high quality wetlands from conversion to cropland, and improve important wildlife habitat.

Reduce flood damages to rural communities and to farmland.

Enable farm and forest producers to work toward energy self-sufficiency using methods that conserve and protect soil resources.

Increase the use of organic wastes for soil tilth and fertility; reduce downstream urban flood damages; prevent unnecessary conversion of important farmlands and wetlands to urban uses; and reduce sediment delivery from urban construction sites.

Each of these objectives will have quantitative targets. They also will be supplemented with specific goals for the first 5 years under RCA. Each 5-year goal is designed to move us part of the distance toward eventual attainment of our 50-year objectives.

We know that the success of any effort depends in large measure on the way it is carried out. These approaches constitute major policy issues affecting the shape and content of our recommended program.

One approach being given serious consideration is targeting of USDA agency efforts toward areas of greatest need based on a combination of local, State, and Federal initiatives. This focus on critical needs will enable us to get more conservative work accomplished for each dollar spent and to evaluate the results of our work more effectively.

Examples of targeting include:

Providing intensive treatment, with substantial technical assistance and sharing of installation costs, in those areas where soil erosion rates are excessive and where water quality is seriously impaired by agricultural pollutants.

Preserving high-value wetlands that are vulnerable to conversion to croplands, and improving wildlife habitat where erosion rates are high or habitat quality is low.

Giving first priority to assisting those areas where ground water is being withdrawn faster than it is recharged, and where surface water storage and instream flows are inadequate.

A second approach is a strong focus on State and local decisionmaking. The excellent record of accomplishment of soil conservation programs during the past 45 years is due in large measure to the local participation of conservation districts and agricultural stabilization and conservation committees, as well as the involvement of State conservation agencies in planning and leadership.

If we follow and improve on this established pattern, a great deal of the decisionmaking on technical and economic matters would be carried out at the field level and on the farm.

In taking this approach, we would be recognizing that State and local units of government already are deeply involved in soil and water conservation, and that this involvement should continue. For example, we need to take a look at the State laws already on the books in fashioning Federal programs. There is a growing body of State law today in the areas of soil conservation, water conservation and water quality, and protection of wetlands and important farmlands. Some 15 States now have a regulatory nonpoint source pollution control program, and at least 6 States also have a cost-sharing program.

A third approach could emphasize interagency coordination, not only among USDA agencies, where it is certainly needed, but among all Federal agencies concerned with conservation and the environment. An example is the coordination between USDA agencies concerned with water use and conservation and the Environmental Protection Agency, which has the lead for Federal water quality action. We also need continuing and improved cooperation between USDA agencies concerned with wildlife habitat and wetlands, and such agencies as the Fish and Wildlife Service of the Department of the Interior.

In all our recommended programs, we want to foster more USDA cooperation with—and participation by—State and local units of government. Public agencies at all levels should work together toward common goals of resource conservation, so that the land user is not confused by conflicting programs and aims. We also need to avoid duplication of programs and efforts.

As a fourth approach to program planning, we are considering pilot programs on a limited basis for incentive plans and delivery systems. Many different proposals have been offered for getting more conservation treatment on the land, yet even the most promising are still untried and need to be tested as pilot projects. These would be tried in various parts of the country to study their comparative effectiveness in different settings.

In an attempt to reduce soil erosion, for example, we would like to test various conservation incentives on farms in 11 States. We also need a trial of conservation performance payments, which would reimburse farmers for the value of soil saved through conservation measures. We would like to try out conservation easements to limit agricultural practices that promote excessive erosion by purchasing

conserving easements from landowners. And we would like to test conservation contracts between land users and USDA that represent a commitment to reduce excessive erosion by a specified amount over the contract period.

A fifth approach could expand cost-sharing to assure that land users are not unfairly required to bear heavy costs for conservation measures from which they receive little or no benefits. The general rule for setting cost-sharing rates would be to determine the portion of the cost of a practice that cannot be offset by direct benefits to the land user. This would help determine the proper Government share, although that would not be the only consideration. The cost-share rate would vary by location for different types of practices and would normally be determined and agreed upon in local areas.

As one would expect, the thrust of each of these five program approaches has been the subject of prolonged discussion within and outside the Department. The program and approaches are developing!

Among these approaches we can chart a course of responsible use and stewardship of our soil and water resources. Through testing of new approaches we can gather the reliable data and experience on which to build the future of American agriculture.

The future of USDA's soil and water conservation programs very much depends on—and will contribute to—the outlook for agriculture in the Nation and the world. It also will depend heavily on public acceptance and support of our objectives and approaches.

Public opinion is being given great weight in developing recommended RCA programs. We have invited public views on an early and continuing basis. Nearly 165,000 people attended some 9,000 local meetings during mid-1978. Other opportunities for citizen ideas came in 1979 through a public opinion survey by Lou Harris and Associates and a new round of public meetings. In 1980 we also held a series of regional meetings and sought written comments on the draft RCA documents. In this activity alone, we received more than 65,000 responses. The public will have another chance to comment on the draft recommended program in January.

The issues regarding the condition of our natural resources converge into one overriding policy question: What are we willing to do as private citizens and through public programs to assure that America has options for the future?

How much are we willing to invest to protect our land from excessive soil erosion and have it available for future generations to use as they believe they must? To what extent can we justify keeping acres in farming that might be shifted irreversibly to other uses? How far should we go in reducing water pollution from agricultural sources? How will we deal with our current inefficiencies in irrigation and excessive use of ground water? How important is it to protect high quality fish and wildlife habitat? What measures are we willing to take to protect communities from devastating floods? What steps are we willing to take to insure that energy production from agriculture occurs without harming the land?

As we develop answers to these issues through RCA, we must select those program approaches which are effective, contribute to economic and social benefits, are environmentally defensible, and have public acceptance.

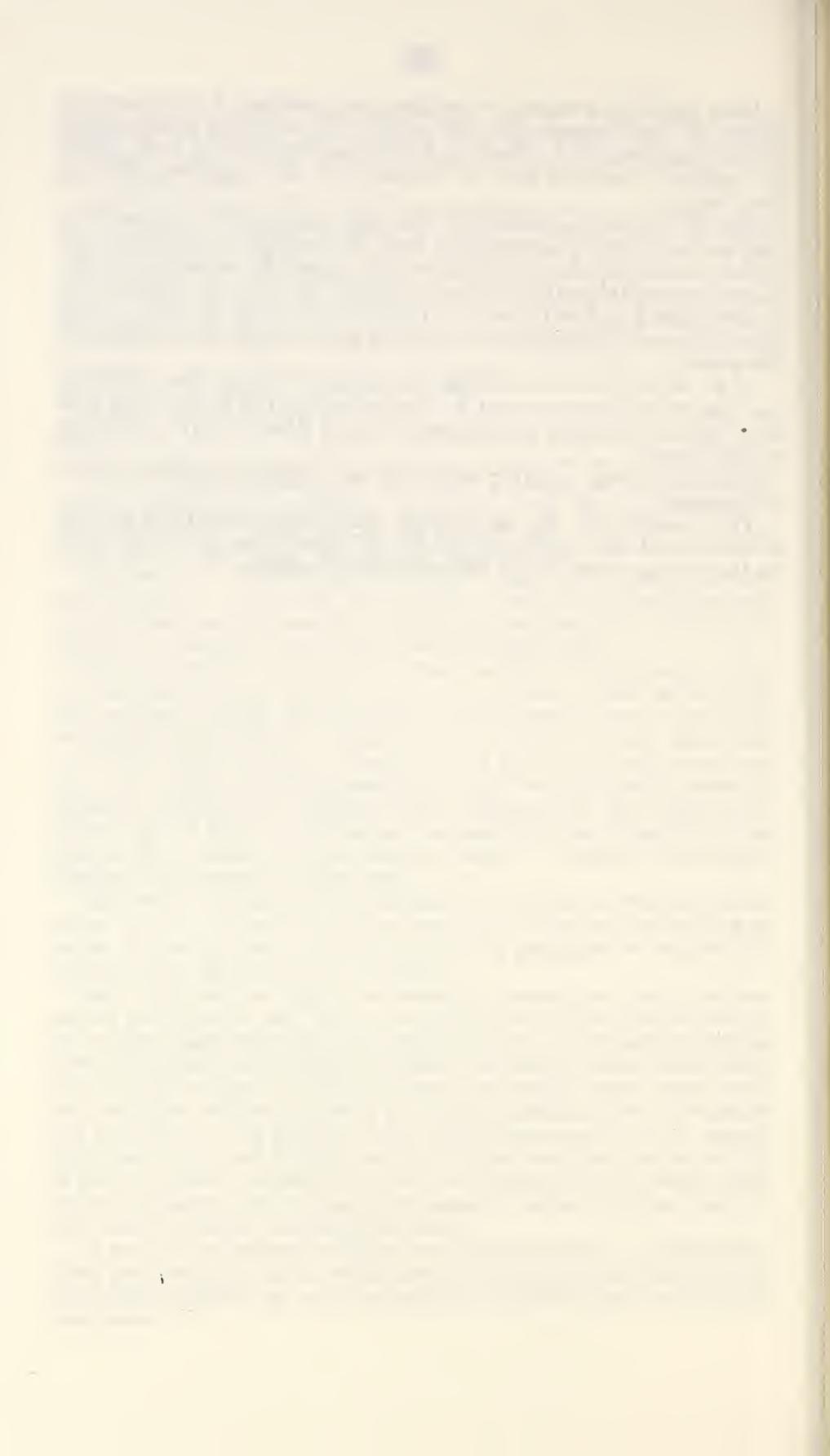
Once the RCA program is in place and working, it will meet the intent of the Congress that the conduct of programs administered by the Secretary of Agriculture for the conservation of (soil, water and related) resources shall be responsive to the long-term needs of the Nation.

The RCA process provides us the best opportunity we have ever had to learn how to balance the need for long-term productive capacity—a permanent agriculture—with the need for economic efficiency, environmental quality, and social values. We have the opportunity to understand and settle on the tradeoffs that must be made among these values and to learn to measure and communicate the benefits and the costs.

If we succeed in our learning and in our choosing, then I believe our Nation will be prepared to meet whatever the future food and fiber requirements may be, without giving up other equally compelling societal needs.

Such a challenge is taxing our vision, our ingenuity, and our ability to respond.

Yet it can be met. We can enhance the productivity of our natural resources and the quality of life for all Americans. And that must be the driving force of our soil and water programs.



FAMILY LIVING

PENSIONS

(By Frankie N. Schwenk, Family Economist, Family Economics Research Group, Science and Education Administration, U.S. Department of Agriculture)

A major financial goal of families and individuals is maximum economic well-being over the life cycle. This requires the distribution of income from earnings and assets in a manner that balances income with changing income needs. A retirement financial plan facilitates the building of assets during employment years to provide income for later years. For some families, pensions are an important component of that plan.

TRENDS IN PENSION PLANS AND THE OUTLOOK FOR THE FUTURE

Approximately 50 percent of the work force is covered by a pension plan. The half million pension plans in operation cover 30 million persons, three times the number of persons covered in 1950.

During the 1940's and 1950's, the number of pension plans in operation and the number of persons covered grew rapidly for a number of reasons. While the Social Security Act was passed in 1935, its growth was slow and individuals turned to pensions for additional security. Individuals, recalling Depression-era experiences of relatives or friends, were receptive to the idea of shared saving for retirement. During the tight labor market of the war years, employers offered pension benefits to offset restricted compensation due to wage and price controls. In the 1950's, pension plans became a major issue in collective bargaining. In the 1960's, most of the growth in pension plans was due to increased employment in firms that already had pension plans rather than the introduction of new plans.

During the 1970's, pension coverage leveled off, and the outlook is for pension coverage to remain at its current level. Several factors account for this leveling off. A high percentage of the most accessible employee groups have been covered [14]. Pension reform legislation enacted in 1974 may be a constraint to new programs. This legislation, the Employee Retirement Income Security Act (ERISA), was designed to improve the financing and operation of employee pension plans. Since ERISA was enacted, many small plans have been terminated and the rate of formation has decreased sharply. This may be related to increased administrative and disclosure costs that are required for compliance of plans with the provisions of ERISA, although the majority of terminations seem to be related to general economic and business conditions. The increase and indexing of social security benefits in the mid-1970's have increased the replacement ratio of social security benefits to preretirement earnings and have required employers and individuals to increase their contributions to social

security. High rates of inflation erode pension benefits, whereas the social security program provides automatic cost-of-living adjustments.

Growth in pension coverage could come if unions continue to push for retirement benefits, if pension coverage becomes mandatory, or if pension plans continue to be afforded favorable tax treatment. However, it does not appear to be a time for pension plan growth, but rather a time for evaluating the equity and role of present plans. At present levels, pension assets are a significant component of the Nation's economy and of the portfolios of many individuals and families.

Pension plans vary widely, with differences in funding, vesting, and benefits. In most plans, individuals are not required to contribute to their private pension plan; employers pay 92 percent of the total contributions to retirement plans. Plans may be classified as defined contribution or defined benefit. In defined contribution plans, a fixed contribution to an individual's account is made and contributions are invested. Benefits received at retirement are based on the amount of money in the individual's account at that time. In defined benefit plans, the amount of benefits an individual will receive upon retirement is determined in advance but the amount of money contributed to the fund varies. In defined benefit plans, benefits are often determined by an employee's length of service and earnings history with calculations based on either the earnings averaged over the career or final earnings just prior to retirement.

Families with higher incomes are more likely to have benefits from pension plans than are those with lower incomes. Of wage earners with gross family incomes of \$20,000, 70 percent are covered by either a public or a private pension plan or both [9]. Of wage earners with family incomes of \$10,000 or less, 70 percent are not covered.

Women are less likely to participate in a pension plan and less likely to be entitled to benefits than are men, partly because women are less likely to have union status, more likely to work part time, more likely to be employed in small firms, and more likely to fill positions in low-paying industries and occupations. When women do receive pensions, the benefits are typically one-half the amount of men's because of the fewer years of plan participation and lower earnings [12]. Those benefits may be seriously eroded by inflation over the retirement period, which is generally longer for women than for men. As spouses of plan participants, women may be left without any pension plan benefits because the husband died before reaching retirement age or because he failed to choose the survivor annuity option at retirement. Moreover, pension plans usually do not cover divorced wives.

A 1979 study of the Bureau of the Census showed:

The coverage rate was 50 percent for white workers, compared to 46 percent for workers of all other races.

Almost four out of every five employees represented by a union were covered by a retirement plan, a proportion twice as high as the coverage rate for employees not represented by a union.

Workers in establishments with 500 or more employees were almost 2½ times as likely to have pension coverage as workers in establishments with fewer than 100 employees.

Coverage in most occupations was between 50 and 60 percent, with low-paid, high-mobility service, labor, and sales jobs having significantly lower coverage rates [2].

CONCERNS RELATED TO PENSIONS

The President's Commission on Pension Policy is examining the Nation's retirement, survivor, and disability systems, and is developing recommendations to be reported in February 1981. Problems identified in their interim report [9] include: Lack of pension coverage for many, inequitable treatment of women, erosion of benefits due to inflation, inadequate incentive for retirement savings, and increased dependence on pay-as-you-go programs. Two concerns in which there is considerable interest are portability of pensions and age of retirement.

Portability.—Portability addresses the concern for preserving vested pension rights.¹ When an individual leaves a job, many years may elapse between termination of employment and the age at which pension benefits from that employment begin. A provision allowing the terminating employee to carry the present monetary value of his or her pension to a central clearinghouse fund or to the next job, could help individuals preserve pension benefits and provide an opportunity for growth of the assets.

Portability recommendations cover only employees who have vested pension rights. ERISA allows three alternative vesting schedules, but all result in at least 50 percent vesting with 10 years of participation and 100 percent with 15 years [6].

In 1974 some changes were made by ERISA to facilitate portability. Provisions were made for a tax-free transfer of money from a pension fund to the pension plan of a new employer or to a qualifying IRA—individual retirement account, annuity, or bond. Requirements include a 60-day time limit. The Social Security Administration was given the responsibility for maintaining records of vested individuals who have terminated employment and supplying this information to the same individuals when they apply for social security benefits.

Despite these changes, mobile workers may still lose some pension benefits. For example:

1. In order to lessen administrative burdens to the employer, ERISA allows employers to "cash-out"—pay a lump sum to terminating employees that covers his or her vested benefits. Some employees spend this cash instead of putting it in an IRA or other retirement plan. Although this allows an individual a choice, it does divert pension funds to nonretirement use. A portable pension fund plan could provide a place to channel "cash-out" amounts, thus preserving the pension [13].

2. Vested pension benefits which remain with the employer's plan are frozen as of the time of separation and are usually not available if the individual is disabled or dies prior to retirement.

3. In an inflationary economy, a worker with four jobs during his career receives a smaller total pension than a worker with one job. Benefits figured on the final earnings will be less for the first job than for the last job. Thus, the pension, though based on final earnings in each job, will be based on earnings that are similar to the average earnings over the career, rather than to final earnings. The higher

¹ Vested refers to the right to accrued benefits, even if employment under the plan terminates before retirement. Employee contributions are always fully vested.

inflation, the greater the penalty. At 6 percent annual inflation, a single-job worker would receive almost twice the benefits of a worker with the same salary base who had four jobs during his career [8]. Although benefits based on final earnings provide implicit indexing for people who work for one employer until retirement (because wages rise with inflation), employers may resist indexing vested benefits for terminated employees. If individuals could transfer the monetary value of their accrued pension credits to the clearinghouse or succeeding employers, there would be the possibility that the rate of return on accumulated assets could help offset some of the effects of inflation.

Because an individual can use IRA's to provide his own portable fund, a clearinghouse may not be necessary. There are other concerns: (1) A clearinghouse would require widespread participation in a transfer system, but employers may be reluctant to accept the administrative costs of calculating and effecting transfers [2]. If required to make large lump-sum transfers, pension plans may have to keep more assets in liquid investments, thus reducing the return on investments and the assets available for benefits.

Choice of retirement age.—In 1978, 61 percent of the persons who retired under social security were under 65 years of age, compared with 32 percent in 1965. Currently, 36 percent of the applicants for social security benefits actually retire at 62 [11]. If expectations were the deciding factor, this trend would continue. In a household survey of 6,100 adults, this conducted by the President's Commission on Pension Policy, 47.5 percent indicated they expect to retire at age 62 or before [10].

However, several factors may lead to later retirement: Inflation, increasing longevity, demographic changes, and legislative changes. A major incentive to work longer may be the surge in living costs. Inflation, combined with earlier retirement and longer life span can create serious erosion in the economic well-being of individuals and families. At a 5-percent annual rate of inflation, the value of a fixed pension would drop nearly a quarter in 5 years; at 10 percent, it would drop one-third in 5 years [3].

Average life expectancy rose from 47 years in 1900 to 68 years in 1950, leveled off, then increased again in the 1970's [11]. With increasing longevity, perhaps retirement should be set as a percent of the expected life span, rather than at a particular age. A man at 65 today can expect to live 14 years; a woman at 65 today can expect to live 18 years.

Demographic trends toward an older population will result in a change in the worker/dependent ratio. A declining number of workers will support a growing population of retirees. The baby boom generation will begin retiring in 2010, and by 2030, the ratio of people 65 and over to the working age population will double [11]. In 1978, income transfer programs from the working population to the retired population represented 7 percent of the income of the working population. If current average retirement age continues, this share would double to 14 percent of the working population income by the year 2030 [11].

To meet the increased need for retirement funding—(1) the working population may accept an increased level of intergenerational transfers to the elderly; (2) there may be more advance funding of benefits where contributions of today's workers are set aside for their future

retirement, rather than pay-as-you-go plans where contributions of today's workers pay for benefits to present retirees; and (3) retirement age may be increased.

Some steps have been taken to encourage later retirement:

1. An amendment in 1978 to the Age Discrimination in Employment Act made it unlawful to forcibly retire workers under 70 years of age. Although it appears less than 10 percent of the people reaching 65 will keep working, the law makes it possible for individuals to elect to do so.

2. In 1982, workers 70 or older will be permitted to earn any amount and still draw their full social security entitlement.

3. In 1982, social security benefits will increase by 3 percent (instead of the present 1 percent) for every year a worker postpones retirement after 65.

If eligibility ages for retirement benefits are to be changed to discourage the present trend of early retirement, a substantial amount of early warning must be given to allow for retirement planning.

PENSIONS AS A COMPONENT OF A RETIREMENT FINANCIAL PLAN

Current consequences of retirement plans.—For individuals and families in early and middle years of the life cycle, retirement plans have current, as well as future, consequences. The choice of financial instruments for retirement planning affects present tax liability. Taxes on many pension benefits do not need to be paid until the worker retires and collects benefits. At that time he or she is usually at a lower tax bracket than at the time the benefits were earned. Thus, pensions and other tax-deferred plans help equalize tax liabilities over the life cycle. For many workers, a pension is the only savings plan available that has a tax advantage.

Current insurance and savings programs may be affected by components of a retirement plan. For example, pension plan coverage may affect life insurance decisions. Under some plans, pension benefits are lost if an employee dies before retirement, but under other plans pension benefits are paid to the survivors. The amount and nature of pension benefits may also affect savings. If an individual has a variable annuity retirement plan, other savings might be placed where there is a fixed return.

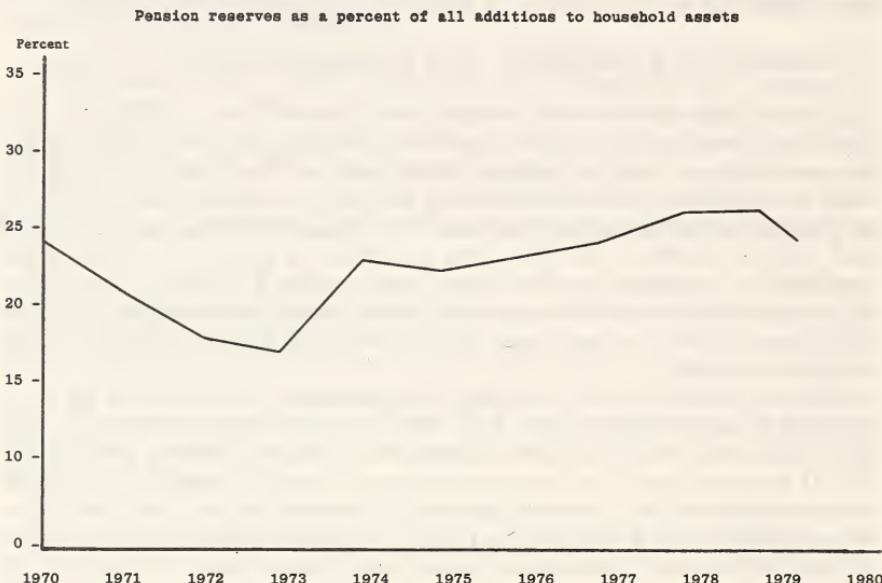
Resources available for current consumption are also affected by the amount and way a family or individual sets aside resources for retirement. Two out of three households save or invest for retirement purposes, thus reducing currently available resources.

The value of current employment is affected by employer-sponsored retirement plans since the total value of labor includes not only current wages and benefits but also future benefits. In 1975, for every \$100 of wages and salaries in private industry, \$4.73 was contributed to pension plans [15].

Pensions and savings.—Retirement financial plans of families and individuals usually start with a base of social security that is supplemented with income earned after retirement, personal savings, and private pensions. These components interact in ways that are not entirely clear: Studies of time-series data suggest that social security

decreases private savings [5, 7]. Other studies, however, show that either the social security system does not have a significant effect on private savings or that analysis of the time-series data does not isolate that effect [4]. Effects of social security on saving may be offsetting—the establishment of a somewhat standard retirement age may have the effect of increasing savings in response to expected retirement; expected benefits of social security, however, may have the effect of decreasing private savings.

For some families, pensions represent a substantial portion of their assets. Data in the "Flow of Funds Accounts," Federal Reserve System [1], indicate that pension reserves comprised about 27 percent of all additions to household assets in 1979. The chart shows the contribution of pension reserves to household assets over the last 10 years. Only half the work force is covered by a private pension fund, so for those households, pensions would represent an even higher percent of additions to household assets.



Source: Board of Governors of the Federal Reserve System, Division of Research and Statistics. 1980. Flow of Funds Accounts, 1st Quarter 1980, I 80.

Planning for the future.—Plans made in early and middle years of the life cycle affect the time of retirement and style of retirement. Half of the work force is not covered by pensions and must give particular attention to retirement income plans. For that half who are covered, understanding the features of their particular pension plan may increase the effectiveness of their retirement financial decisions and may increase the pension benefits received. Rules governing eligibility requirements, vesting, early retirement, disability retirement, and pre-

retirement death benefits vary among plans and are important in determining benefits. Under ERISA, employees are entitled once a year to request from a plan administrator a statement of his/her vesting and accrued benefit status.

Decisions concerning pensions may be complex because pensions are often tied to a choice of employment and may be difficult to sort out from other fringe benefits. However, pension-related decisions may have a direct impact on the retirement portfolio. For example, a person who leaves a job before being at least 50 percent vested may lose pension contributions from the employer. Mobile workers or persons planning to drop out of the labor force and then return could time that decision in a way that would minimize loss of benefits.

There may be specific decisions related to a choice of pension plans from the employer. Some plans offer a choice between variable or fixed annuities and between tax deferred or nondeferred plans. Those decisions are made in early or middle years but impact the family's financial affairs throughout the life cycle.

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FAMILY FINANCIAL PLANNING—RESEARCH

(By Colien Hefferan, Economist, Family Economics Research Group, Science and Education Administration, U.S. Department of Agriculture)

FAMILY FINANCIAL PLANNING

In a period of rapidly escalating prices and visibly diminishing resources, family financial planning becomes both more difficult and more important. The economic uncertainty that complicates the financial planning process also accentuates its importance. For example, how many families purchasing a home in 1965 anticipated that in 1980 their monthly home utility bills might exceed their mortgage payment? How many couples retiring in 1970 with a "comfortable" monthly annuity of \$480 anticipated that estimated living costs for a retired couple would exceed \$650 per month in 1978?¹

These past economic conditions provide an excellent object lesson in the value of planning, but how many families will be prepared to apply these lessons to the contingencies of the future? Are we prepared for an 8-percent rate of inflation or a 12-percent rate or a 15-percent rate? A few percentage points difference in the rate of inflation make substantial differences in projections of future costs. For example, assuming an 8 percent inflation rate, the projected annual living cost for a retired couple is \$43,000 in the year 2000; at 12 percent inflation, the projection is \$95,000. At 8 percent inflation, the projected direct cost of raising a child born in 1979 to age 18 is \$134,000;² at 15 percent it is \$282,000. When the range of economic possibilities is this broad, how can families effectively plan their economic futures? The purpose of this paper is to review research related to family financial planning and to analyze how this research might be used to develop and implement programs to help families with their financial planning in uncertain times.

Both the depth and breadth of interest in family financial planning increased substantially in the 1970's. This interest was evidenced by the successful introduction and expansion in circulation of magazines and newsletters devoted to topics related to financial management and planning, a significant increase in the number of column inches devoted to these topics in general magazines and newspapers, an expansion of radio and television coverage related to family financial planning, growth in the "profession" of financial counseling and guidance, and increased demands on cooperative extension and other educational systems for programs related to family financial planning.

¹ Based on the intermediate cost level budget for a retired couple calculated for autumn 1978 by the Bureau of Labor Statistics. For more information see reference 12.

² Based on estimates for the urban North-central region at the moderate cost level. For more information see reference 8.

There are two basic approaches to family financial planning. The first approach focuses on the maintenance and enhancement of family economic well-being, while the second approach involves the remediation of family financial problems.

There are many groups and organizations providing assistance to families seeking guidance in the area of financial planning. For example, the 7,000 members of the International Association of Financial Planners (IAFP) are involved in family financial planning from the perspective of enhancement. IAFP members include persons with backgrounds in insurance, investments, banking, real estate, and related professions. Approximately 25 percent of the members of the IAFP are certified financial planners and have been trained through the College for Financial Planners in Denver. Members of the IAFP and related professionals annually reach an estimated 50,000 middle and upper income individuals and families.

Similarly, many organizations and professionals are involved in family financial planning directed at the remediation of financial problems. The National Foundation for Credit Counseling estimates that more than 200,000 families are reached each year through free or low-cost services provided by 203 local, nonprofit consumer credit counseling services. Similar numbers of households are provided with services through organizations such as social service agencies, churches, credit unions, labor unions, and fraternal organizations.

The Cooperative Extension Service reaches thousands of families at all economic levels each year with educational programs designed to both maintain and enhance economic well-being and remedy financial problems through effective family financial planning. Through its information network, the Extension Service reaches many other individuals and families with knowledge and strategies related to family financial planning.

RESEARCH

Programs to help families plan their finances are developed on the basis of two types of research and knowledge. The first type concerns the content of family financial affairs and includes such topics as forms of saving and investing, principles of insurance, sources of and regulations governing consumer credit, and housing selection. The second type concerns the principles of planning and includes research related to the process of planning, that is, research that identifies the motivation of planning and the skills necessary to effect a financial plan. Research related to the characteristics of persons who are effective planners, that is, research that identifies the life cycle and family characteristics, as well as socioeconomic and social psychological variables that are associated with planning behavior is also included in this category. The following discussion focuses on research and knowledge related to the principles of family financial planning.

The concept of financial planning is distinct from the more general notion of financial decisionmaking. Family financial decisionmaking is generally defined as the conscious direction of behavior at one point in time toward the attainment of predetermined goals [9]. Family financial planning is defined as the determination of these goals and the arrangement of resources to reach these goals while maximizing

well-being over time. Planning is a dynamic process that includes the concept of time—time not only as a resource to be exchanged for another resource, but time as the continuum on which decisions are made. Financial planning implies that there is recognition of the fact that decisions made at one point along the planning continuum affect the resources, opportunities, and choices of the future.

Process.—Research related to the process of family financial planning has confirmed two things: (1) The rationality of behavior and (2) the resilience of habits. Research that suggests that family financial planning is a reasoned process has generally been designed to test a specific behavioral hypothesis or theory. For example, research conducted by Kinsey and Lane [10] to assess the relationship of debt to perceived household welfare was based on an adaptation of general investment theory. The authors contended that consumers plan their saving and debt based on their perceived rate of return from these activities and their valuation of the present time period relative to the future. This application of investment theory incorporates two important components of family financial planning—recognition of the interrelatedness of decisions and recognition of the role of time in the planning process. Kinsey and Lane found that debt, while reducing the net worth of the family, can contribute to the household's overall sense of well-being if it is used to rearrange financial resources over time to match life cycle patterns of needs and goals to life cycle patterns of income.

In several classic studies, Bymers [2], Bymers and Rollins [4], and Bymers and Galenson [3] also analyzed the role of investment and debt in family financial management as a way to understand the process of financial planning. They identified the time frames in which decisions are made, and developed a system for classification of household expenditures and accounts. In this system, expenditures are divided into groups according to whether the expenditure is for remedial purposes (e.g., debt repayment), current needs, or future plans. This system allows the researcher to identify the types of families who are actively engaged in financial planning and to study the relationship of planning to the overall budget process. The system also allows families to see how their expenditure behavior reflects commitment to the financial planning process.

It is on the basis of family financial goals that families direct their planning behavior. Several financial goals are cited as motivation for financial planning. These include home ownership, education of children, and adequate retirement income. Paynter [11] analyzed the relationship of strength of goal commitment in the area of housing to the types of behavior in which families would be willing to engage in order to attain their goals. She reported that strong commitment to housing goals was related to willingness to increase labor force activities of family members, reduce expenditures for luxury items such as meals away from home and entertainment, and reduce expenditures for intermittent necessities such as dental care.

The resilience of attitudes and behavior related to family financial planning has been demonstrated by use of data from the Panel Study of Income Dynamics. Duncan and Hill [6] report that attitudes and behaviors set at one period of time are slow to change in response to

change in the broad economic climate or the specific economic conditions confronting the family.

Recent research regarding the process of planning has attempted to distinguish several "styles" of planning behavior, especially styles that denote ability to adapt to change. Beard and Firebaugh [1] developed a measure to assess orientation to morphostatic planning behavior, that is, behavior characterized by difficulty in adjusting to change, and morphogenetic planning behavior, that is, behavior characterized by ease of adjustment to change. They reported several factors that distinguish morphostatic and morphogenetic planning behavior. Morphostatic planning behavior is characterized by orientation to current needs, inflexibility regarding standards and sequencing of plans, and strong adherence to externally imposed rules. Morphogenetic planning behavior is characterized by receptivity to new demands, flexibility, broad participation by all family members in the planning process, and foresight regarding the consequences of current behavior. This research is especially useful in designing programs to help families with the process of financial planning.

The findings from studies related to the process of financial planning have several implications for program development. First, because planning is a reasoned process that is directed at the attainment of specific goals, family financial planning programs should include strong emphasis on goal identification and clarification. Many families may be ineffective planners because they simply do not have goals. In the life skills program developed by Danish and D'Augelli [5], goal identification is the first and most strongly emphasized skill. This may serve as a good model for program development in the area of family financial planning.

Second, research suggests the importance of developing programs that establish positive planning behaviors early in the life cycle. While many circumstances, usually crises, may act to temporarily alter our established patterns of behavior, positive, long-term planning behavior is most effectively initiated in the early stages of the family life cycle.

Third, research provides evidence that there are distinctive styles of planning behavior. Families that have developed one style of planning behavior may not benefit from programs that attempt to implement another style. For example, the findings of Beard and Firebaugh suggest that programs to help families deal with economic change would need to be designed differently for families with morphogenetic planning behaviors than for families with morphostatic behaviors. Other factors that characterize style of planning behavior, such as attitudes about risk, might also influence program development and acceptance.

Persons.—Three sets of factors appear to characterize families who are likely to engage in financial planning. These include degree of commitment to goals (as discussed in the Process section), stage of the family life cycle, and socioeconomic characteristics. These factors are often interrelated.

In a study of families in debt, many of whom characterized themselves as ineffective planners, Wright [13] described families with severe credit problems as likely to have the husband as the major breadwinner and unlikely to have the wife employed (25 percent em-

ployment rate among wives), likely to have a breadwinner with a high school diploma or slightly less education, likely to be home renters rather than owners, and likely to have many creditors.

Bymers and Galenson [3] noted strong relationships among types of investment and level of income, education, age, life cycle stage, and family composition. For example, high income was associated with investment in education of children and other family members; the early stage of the family life cycle was associated with investment in durables and personal insurance; and an older family head was associated with contributions to organizations.

Clearly, level of income is an important determinant of family financial planning behavior. Without adequate income to meet current needs, families are handicapped in planning for the future. Nevertheless, low-income families in the early stages of the family life cycle frequently exhibit planning behavior suggesting that expected income, rather than current income, is related to planning. Duncan and Newman [7] report that family life cycle stage is among the most important determinants of planning related to housing goals.

New research is being initiated at the Family Economics Research Group to analyze orientation to family financial planning, including styles and effectiveness of planning among families at various stages of the life cycle. This research will be useful in identifying the stages at which families begin planning for critical economic events, such as retirement. It will also identify the strategies that appear most effective in the attainment of family financial goals.

Research findings regarding the persons who are inclined to be effective financial planners suggest a recurring problem for program planners. Those most likely to need planning skills are those least likely to seek them. Consequently, for families wishing to enhance their economic well-being, programs might be designed so that the responsibility for participation rests solely with the client. These programs might be delivered by use of a group, educational format. For families who need financial planning skills in order to remedy a specific problem, programs may require joint responsibility on the part of the participant and the program planner and possibly referral from a third party. For example, an individual "counseling" program or small group session may be effective for teaching skills to resolve a specific problem.

TRENDS

One of the primary purposes of the annual Food and Agricultural Outlook Conference is to identify the economic, social and technical trends that will be useful in predicting the future. Several trends emerge for research related to family financial planning.

First is the trend toward research that focuses on the broad spectrum of resources available to families over the life cycle. For example, there is evidence of renewed research interest in the relationship of the use of time within the household to the attainment of economic goals. The Family Economics Research Group is currently supporting projects at the University of Wisconsin, the University of Missouri, and the Ohio State University to develop new research techniques that can be applied to the analysis of household production. This type of research

will help us to understand how household production relates to the household's ability to save or adjust to changing economic conditions.

Similarly, this trend toward analyzing resources over time is seen in new research and program efforts concerning family financial planning over the life cycle. Work has been done to identify the planning tasks associated with each stage of the life cycle and to determine the information and skills needed to successfully complete the task.

The second emerging research trend related to family financial planning is the analysis of life cycle costs. For effective planning, households need to estimate the total cost of ownership and operation of household durables. This is especially important in light of increasing energy costs. Methodologies are being developed to incorporate initial cost of purchase and life cycle cost of operation and maintenance into one overall estimate of cost that can be used by households to make financial decisions.

The third area of renewed research interest related to family financial planning is the analysis of resource networks developed by families in order to attain their financial goals. These networks can be seen in the barter and exchange systems that have developed in some communities—systems that the Internal Revenue Service refers to as the "subterranean economy"—and in the increased interest in systems for the intrafamily transfer of income and wealth.

The fourth trend that is likely to be reflected in research related to family financial planning is the increasing use of computers and other electronic information systems in financial decisionmaking and transactions. In several States, including Indiana, Michigan, and South Carolina, extension specialists have developed programs in which electronic technology provides individualized education to the public. These or similar extension programs are currently in use in all States with computer capability. Research should be conducted for rating not only the effectiveness of these tools in facilitating the financial planning process, but also the acceptance and use of these planning tools by families.

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FINANCIAL COUNSELING

(By Mary Ann Hewitt, Extension Home Economist, Cooperative Extension Service, Montgomery County, Md.)

The Montgomery County Cooperative Extension Service started a volunteer financial counseling program in 1967. We have an average of 80 volunteers a year who counsel at least one family a year. Many counsel up to five families. Montgomery County is one of the metropolitan Washington counties. We have a median income of \$26,000 and a high educational level. Montgomery County has one-third of all the college graduates in the State of Maryland. Yet 10 percent of our population is low income.

Our program is divided into four parts: (1) Recruiting volunteers and families, (2) training volunteers, (3) program administration, and (4) follow up or evaluation.

RECRUITING VOLUNTEERS AND FAMILIES

Over the years we have utilized many methods of recruiting our counselors. I would like to start by saying that we have many people who call and ask to be a counselor. Many of our counselors are active church members and are fulfilling a dual volunteer role. As you may have guessed, we recruit through churches. Our county has a community ministers association. Annually, we go and give a report and ask that an announcement be run in their church bulletin requesting financial counseling volunteers. Many volunteers are recruited by word of mouth from families and other volunteers. This is a program that a volunteer can see behavior change occurring almost immediately. We have a counselor who has been presented with a jar full of cutup credit cards. The two major newspapers in the metropolitan area run recruiting announcements in their community bulletin board section. Also, local county papers have picked up announcements. We make signs and distribute them through our library system and the county government. Our county has a volunteer bureau and we recruit through them.

RECRUITING FAMILIES

When the financial counseling program started 13 years ago, it was geared toward the low-income population. Originally, the income guideline was poverty level. Gradually, that increased to \$10,000 then to \$15,000 and now it is \$25,000. That is very high to many of you but not to our county where the median income is \$26,000.

Our families are recruited using many of the same methods as we used for the volunteer recruitment with the exception of any mass media. We are careful not to advertise in major papers because we

realize that we do not have the resources to handle the demand. Through the churches we recruit families; by word of mouth through the minister or the social concerns committee. Over the years we have established an informal network within the county government. The Office of Consumer Affairs, information and referral, and social workers within the various departments of county government refer families to us. Our best recruiting technique is word of mouth by pleased families.

VOLUNTEER TRAINING

The training consists of 6 to 8 hours of instruction. We have varied the number of times we meet for training and concluded it really makes no difference. We have done it in one session, two 4-hour sessions, and two 3-hour sessions. At the end of the training session we present the counselors with a handbook. We emphasize how to counsel. Good counseling techniques are the basis for a good financial counseling program. Think about these questions:

1. Do you have some sort of savings program? Example; piggy-bank, payroll savings or some kind of saving ritual.
2. If you have a savings program why have you established one?
3. If you do not have a savings program what is your reason for not saving?
4. How many credit cards do you have?
5. Do you need these credit cards? Why?

How do you feel about me asking you these questions: Defensive, withdrawn, none of your business are some of your feelings I am sure. Why would we think a person in financial difficulty would feel any different. We are the so-called experts but how many of us would feel free to open our financial picture to someone else?

How to set up a budget identifying family goals and values is a large task for the counselor. Many families feel that the solution to their problem is the form that they keep their records. They do not want to start at the beginning and make financial goals.

A pitfall for many counselors is being a mother or father. A counselor must help the family learn to make financial decisions, not make them for the family. People love to have "experts" make financial decisions for them.

It is very important that the counselor is well aware of all community services to the family. In Montgomery County the agent who started this program compiled and printed all the services available to county residents. Four years ago the county government started printing the information in pocket size form. A counselor must also know how to refer the client to one of these community services.

Many of our families are in trouble because of credit cards; therefore, we teach our counselors the art of negotiating with creditors. In the counselor's handbook there are sample letters to be used when corresponding to creditors. Questions that come to many of your minds; who writes, signs, and types the letters? The family! We stress the fact that our purpose is educational. This is the main difference in our program and other financial counseling programs. In some cases counselors must help amend the sample letter to fit the need of the family. Most often the counselor helps the family compose the letter but always

the letter goes out in the name of the family. We do not assume any financial responsibility for the debt. We have had a very high success rate with creditors renegotiating the debts of our families. Another big pitfall for counselors is wanting to give the family money. Our policy is never to do this. It only provides another crutch for the family. Our policy clearly states that our purpose is financial counseling no other kind. We only work with the financial problem of the family. Seldom do we work with alcoholics, mentally disturbed, et cetera. We clearly state to the counselor our expertise is financial counseling. We have started using a contract with our financial counselors. In return for our training and handbook, they agree to take at least one case.

PROGRAM ADMINISTRATION

The administration of the program is fairly simple. Clients call our office admit they have a problem, and ask for help. No one can call for them. Believe it or not we have had parents call for their children who are over 26 years of age and tells us that the child has a problem. Our philosophy is much the same as Alcoholics Anonymous that admitting the problem is step 1. After the family has called we fill out an intake sheet on them which tells us their financial story. Some of the information we ask for is how many people share the income, what their income is, what their fixed expenses are, who they owe, how much, and how late they are with any bills. Often they have not gathered this information and must get back with us. Many people call us for money, when we explain to them our service, they are no longer interested.

The meetings could take place in a public library, church, et cetera. A question I am sure you are wanting to ask is: How often does the counselor and family meet? This varies individually with each case. We recommend in the beginning that the two meet as often as family gets paid. The extension agent acts as a consultant to the counselor once the match has occurred. In Montgomery County we have a followup system with our counselors. We call each counselor 1 month, 3 months, and 6 months after the assignment is made. Counselors call us freely whenever they have a question, problem, or concern. Our policy clearly states that cases should be closed after 6 months. Again, this varies with each individual case. We have had a case that lasted 2 to 3 years. In this case the counselor did not want to turn the family lose. We have found that as we have raised our income levels, we have closed cases faster. The lower income family often needs more individual attention. Some of our counselors only want to work with lower income families, some only want to work with those who are at the higher end of our income guidelines.

We keep a card file on each counselor with notations as to their preference. Sex can have an influence on the case. For example a single male parent did not relate well to a female counselor.

EVALUATION

Our evaluation consists of three questions: (1) Have you paid your bills on time? (2) Have you added to your debt load? (3) Have you saved?

We call the family 6 months after the case is closed and ask these questions. Again, at the end of the year we call. We started this evaluation system in September 1979. There have been over 50 percent of the families at the end of 6 months who answered yes to the above three questions. We are still phasing in the evaluation at the end of a year and only have had eight families to evaluate. Of those eight families three have moved and five answered yes to the evaluation questions. One of the programs we have in our area is the difficulty in obtaining hard data because so many families move. This type of program lends itself to substantiate behavior change.

HUD'S ELDERLY HOUSING PROGRAM: THE PAST AND THE COMING DECADE

(By Dr. Morton Leeds, Special Assistant for Elderly Housing, U.S. Department of Housing and Urban Development)

In the past decade, much has changed, much has remained the same. Housing production was at its highest peak, in terms of general totals at that time. Subsidized housing stressed public housing and direct loans while rent supplements were beginning to show some good results.

Homeownership was strong (roughly 70 to 75 percent of the elderly), with most homes fully paid for.

A new style of multifamily structure was beginning to emerge as an alternative model of living for the older person.

Urban renewal had displaced hundreds of thousands of older persons, but it was being phased down gradually, as local resistance to the typical renewal program arose, and as the 1968 riots were studied.

Inflation was steady, but at moderate levels.

Design and management were being discussed steadily in the field, with some consideration of supporting technology and supportive services.

Finally, accomplishments in the beginning of the decade were \$202 million spent that year for elderly assistance with 389,000 cumulative units approved, and \$75 million in direct loan allocation for construction, in addition, for 1970.

Since that time, the situation has changed somewhat, by and large, for the better, as far as the elderly are concerned.

Housing, always the goat in times of fiscal difficulty, has gone through two major low cycles, in 1973, with the HUD-directed shutdown of subsidized housing, and in the spring of 1980, with the inflation peak crossing 20 percent bank rates.

Housing production has rarely reached the peaks of 2.8 to 2.9 million units in total, but has hovered between 1.7 to 2.2 million units during those years.

Direct loans have been restored to the arsenal of tools of social policy, reaching \$830 million for section 202 the past year, with \$50 million additional, or \$880 likely in 1981.

Public housing has leveled off at about 50,000 units per year, down from a peak of nearly 100,000 units in the early seventies.

A new instrument, a form of rent subsidy, based on the rent supplement techniques of the seventies, has emerged as a very powerful—although expensive—tool: Section 8. During the decade it has resulted in more housing than was produced in public housing in over 43 years.

Total subsidized housing for the elderly has crossed 1.24 million units approved, housing more than 1.6 million persons.

Totals expended will cross \$2.6 billion in 1981 for the elderly alone. This does not include the \$880 million for direct loans for construction of section 202, either.

One significant goal of the 1971 White House Conference was to see a minimum of 150,000 elderly persons rehoused per year. Interestingly enough, with 110,000 units to be added to stock under subsidy, about 150,000 persons will be rehoused in 1981. Obviously new goals have to be set.

Problems, however, remain across a wide band of the spectrum. For example, condominium conversion is affecting a great many elderly persons unable to buy into the converted units, in many of the larger cities.

Homeownership, with its enormous problems of home maintenance for the older homeowner, is gradually declining among older persons. Much of this older stock is being taken over by younger families with children.

Design has been standardized fairly much; certification of public housing managers goes into effect as of January 1, 1981. Management materials are multiplying rapidly, with HUD helping significantly.

Two very significant problems remain unsolved: inflation, for one. The other is the aging of our residents themselves, roughly at the rate of 1 year older for every 3 years of residence—it would be 1 for 1, if no one died. This aging process brings with it the problems of frailty, need for food service, and some personal services such as housekeeping.

The new congregate housing services program offers an important supplement to HHS's massive food and services programs under title III. However, it is building and management oriented, creates an important new assessment tool, in the professional assessment committees, and provides multiyear funding, so important to the development of additional congregate housing stock.

So where do we go, in the coming decade?

We must set new goals for assistance to the older person, carefully examining the construction versus—or combined with—income assistance strategies. This examination should also include the section 202 program, since we always need to see what gives us the most value for the public dollar spent.

We must carefully evaluate—and the evaluation is now fully underway—the congregate services program, to see how it works, and how it can serve to keep residents in housing longer, and avoid the overwhelming pressure on the medicare/medicaid system, now costing more than \$53 billion per year.

We should study whether older persons may not be able to stay in their own homes longer, with rehabilitation, weatherization, and other forms of home maintenance assistance that would be cheaper and wiser in the long run, than rehousing 23 million older persons.

We should further examine the existing housing stock, to see whether shared housing, under local sponsorship, cannot provide better use as well as better socialization, income assistance and similar benefits for the elderly who may choose to live in their older homes.

We should continue to examine the fiscal benefits that may become possible by reverse annuity mortgages, to provide some help for the older homeowner who is property rich, but income poor.

Finally, we need to continue the attack on inflation, which eats at the financial security of the older person.

TABLE 1

	Total housing outlays benefiting elderly	Subsidized housing units with elderly heads of household		Sec. 202 outlays (construction loans)	Sec. 202 completions (units) new startup with sec. 8 subsidy
		Added in year	New total		
Fiscal year:					
1969	160,000,000	39,000	349,000	76,000,000	-----
1970	202,000,000	40,000	389,000	75,000,000	-----
1971	276,000,000	54,000	443,000	42,000,000	-----
1972	393,000,000	79,000	525,000	-----	-----
1973	562,000,000	59,000	584,000	-----	-----
1974	584,000,000	60,000	644,000	-----	-----
1975	744,000,000	47,000	691,000	-----	-----
1976 ¹	1,225,000,000	139,000	1,830,000	-----	-----
1977	1,073,000,000	94,000	924,000	4,000,000	-----
1978	1,242,000,000	80,000	1,004,000	176,000,000	396
1979	1,659,000,000	124,000	1,218,000	459,000,000	9,716
1980	2,050,900,000	112,000	1,240,000	700,000,000	33,216
1981	2,591,600,000	110,000	1,350,000	700,000,000	51,216

¹ This was a fiscal year with 15 mo., hence all numbers are increased by about 25 percent. (New fiscal year base set.)

Source: Office of Budget, Department of Housing and Urban Development.

TABLE 2.—HOUSING DEFICIENCY RATES FOR THE RURAL ELDERLY; OWNER-RENTER COMPARISONS

	Rural elderly owners	Rural elderly renters	All rural elderly
Units with deficiencies:			
Number	583,000	314,000	897,000
Percent	9.7	24.0	12.3
Units without deficiencies:			
Number	5,404,000	991,000	6,395,000
Percent	90.3	76.0	87.7
All housing units:			
Number	5,987,000	1,305,000	7,292,000
Percent	100.0	100.0	100.0

Source: 1977 National Annual Housing Survey

TABLE 3.—HOUSING DEFICIENCY RATES FOR THE RURAL ELDERLY: COMPARISONS WITH NONELDERLY RURAL AND NONRURAL ELDERLY

	Rural elderly	Rural nonelderly	Elderly nonrural
Units with deficiencies:			
Number	897,000	2,478,000	734,000
Percent	12.3	12.0	6.6
Units without deficiencies:			
Number	6,395,000	18,180,000	10,409,000
Percent	87.7	88.0	93.4
All units:			
Number	7,292,000	20,658,000	11,143,000
Percent	100.0	100.0	100.0

Source: 1977 National Annual Housing Survey.

TABLE 4.—HOUSING DEFICIENCY RATES FOR RURAL NONELDERLY DISABLED: COMPARISONS WITH RURAL NONDISABLED, NONRURAL NONELDERLY DISABLED

	Rural nonelderly disabled		Rural nonelderly nondisabled		Nonrural nonelderly disabled	
	Number	Percent	Number	Percent	Number	Percent
Units with deficiencies.....	1,442,000	18.8	1,768,000	13.6	928,000	14.5
Units without deficiencies.....	6,224,000	82.2	12,992,000	86.2	5,472,000	85.5
All units.....	7,666,000	100.0	11,224,000	100.0	6,400,000	100.0

Source: AHS-SIE file applied to 1977 National Annual Housing Survey.

TABLE 5.—HOUSING AFFORDABILITY RATES FOR THE RURAL ELDERLY: OWNER-RENTER COMPARISONS

		Rural elderly owners	Rural elderly renters	All rural elderly
Over 25 percent cost-to-income ratio:				
Number of households.....	2,698,000	778,000	3,476,000	
Percent of households.....	45.1	59.7	47.6	
25 percent and under cost-to-income ratio:				
Number of households.....	3,288,000	525,000	3,815,000	
Percent of households.....	54.9	40.3	52.3	
Total:				
Number of households.....	5,987,000	1,304,000	7,291,000	
Percent of households.....	100.0	100.0	100.0	

Source: 1977 National Annual Housing Survey.

TABLE 6.—HOUSING AFFORDABILITY RATES FOR THE RURAL ELDERLY: COMPARISONS WITH NONELDERLY RURAL AND NONRURAL ELDERLY

		Rural elderly	Nonelderly rural	Nonrural elderly
Over 25 percent cost-to-income ratio:				
Number of households.....	3,476,000	18,912,000	5,100,000	
Percent of households.....	47.6	15.5	45.8	
25 percent and under cost-to-income ratio:				
Number of households.....	3,815,000	1,746,000	6,043,000	
Percent of households.....	52.3	84.0	54.2	
Total:				
Number of households.....	7,291,000	20,658,000	11,143,000	
Percent of households.....	100.0	100.0	100.0	

Source: 1977 National Annual Housing Survey.

TABLE 7.—NONMETROPOLITAN PUBLIC HOUSING OCCUPANCY BY USER GROUP (1979 ESTIMATES)

	Number of units	Percent
Family.....	91,511	34.3
Elderly.....	156,317	58.6
Nonelderly handicapped.....	19,018	7.1
Total.....	266,846	100.0

Source: HUD's subsidized housing admissions/continued occupancy system.

TABLE 8.—ELDERLY AND HANDICAPPED PUBLIC HOUSING OCCUPANCY: METRO-NONMETRO COMPARISONS (1979 ESTIMATES)

	Metro		Nonmetro		Total	
	Number of units	Percent	Number of units	Percent	Number of units	Percent
Elderly	428,067	73.3	156,307	26.7	584,384	100
Nonelderly handicapped	87,204	82.1	19,018	17.9	106,222	100

Source: HUD's subsidized housing admissions/continued occupancy systems.

TABLE 9.—RURAL¹ ELDERLY SECTION 202/8 LOAN RESERVATIONS

	Projects	Units	Loan amounts
1976	22	1,466	NA
1977	34	2,978	\$80,879,700
1978	35	2,185	65,518,199
1979	54	2,228	97,866,533
Total	154	8,857	-----

¹ Includes projects in communities of up to 20,000 in nonmetro areas, up to 10,000 of predominately rural character in metro areas.

Source: HUD sec. 202 Program Office.

TABLE 10.—SEC. 515 RURAL RENTAL HOUSING LOANS: CUMULATIVE THROUGH FISCAL YEAR 1979

Units:			
Elderly			65,416
Nonelderly			126,162
Total			191,578
Total loans:			
Number			11,108
Amount			\$3,298,430

Source: U.S. Department of Agriculture housing program statistics.

TABLE 11.—SEC. 8 RESERVATIONS—NEW CONSTRUCTION AND SUBSTANTIAL REHABILITATION (CUMULATIVE THROUGH FISCAL YEAR 1979)

	Nonmetro		
	Nonmetro elderly	Nonmetro family	Total nonmetro
Number of units	106,366	82,910	189,276
Percent of total nonmetro	56.2	43.8	100.0
Elderly			
	Nonmetro elderly	Metro elderly	Total elderly
Number of units	106,366	307,240	413,606
Percent of total elderly	25.7	74.3	100.0

Source: HUD's management information system divisions.

TABLE 12.—SECTION 8 CONTRACTS-EXISTING HOUSING (CUMULATIVE THROUGH FISCAL YEAR 1979)

	Nonmetro		
	Nonmetro elderly	Nonmetro family	Total nonmetro
Number of units.....	32,124	79,705	111,829
Percent of total nonmetro.....	28.7	71.3	100.0
Elderly			
Number of units.....	32,124	180,245	212,369
	15.1	84.9	100.0

Source: HUD's management information systems divisions.

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TRANSPORTATION AND THE ELDERLY

(By Peggy Poling Kimsey, Assistant Professor of Family Studies, University of Kentucky, Lexington, Ky.¹)

Transportation has only recently received attention by researchers and scholars interested in gerontology. One theory is that many people do not think about transportation until they do not have it. Transportation can be a barrier to good health, recreation, social activities and many other aspects of a satisfying life. Those with transportation think little about it; those without it, miss it greatly. Transportation is the linkage between a person and the outside environment; it links consumers with goods and services.

The cost of automobiles, auto maintenance and gasoline has also caused both consumers and researchers to examine transportation and the role it plays in our lives. Older consumers have felt the severity of the energy crisis to a greater extent than younger consumers, especially in the areas of transportation needs and resources. As indicated in the 1976 Energy Policy Report of the Ford Foundation, it is necessary to know the level of energy use of various people, what they pay for it, and the manner in which they consume it in order to evaluate present and future energy policies.

Considering the elderly as a large part of the poor, some comparisons can be made between transportation energy consumption of the poor and that of the elderly. The poor represent 17 percent of all households, but they use only 5 percent of the Nation's gasoline and drive 9 percent of its cars. Thus, the poor not only have fewer cars, they also drive their cars less. Since the poor often buy used cars, they are now forced into a market that contains the big gas guzzling cars made in the early 1970's. The older person is also more likely to own a larger, older automobile, versus a smaller fuel efficient car. Therefore, lower income elderly persons will need more gasoline at a higher price, even if their driving patterns do not change (Newman and Day, 1975).

More specifically, transportation has become a major concern to the elderly and those professionals who work with the elderly because of the spiraling costs of that transportation. The transportation component of all household budgets for retired couples has risen in the last 5 years. In 1974 transportation accounted for 6.43 percent of a low level budget for a retired couple, however, in 1979 the transportation component had risen to 6.97 percent of that budget. Even more drastically, transportation accounted for 10.82 percent of a high level budget in 1974 and rose to 12.06 percent of that same type of budget in 1979. See table 1 (U.S. Department of Labor, 1975; Rogers, 1980).

¹ Special thanks is given to Teresa Bayes, Sandy Hough, and Sharon Leitsch for assisting in the preparation of this paper. All three are graduate assistants in the Department of Transportation funded project "Role of Women in Family Transportation" currently being conducted at the University of Kentucky under the direction of Peggy Kimsey.

TABLE 1.—COMPARISON OF 3 BUDGETS FOR A RETIRED COUPLE BETWEEN AUTUMN 1974 AND AUTUMN 1979

	Low		Medium		High	
	1974	1979	1974	1979	1974	1979
Total budget:						
Dollar amount.....	\$4,228	\$6,023	\$6,041	\$8,562	\$8,969	\$12,669
Percent budget increase.....	42.46		41.73		41.25	
Transportation:						
Dollar amount.....	\$272	\$420	\$527	\$820	\$971	\$1,528
Percent budget.....	6.43	6.97	8.72	9.58	10.83	12.06
Percent increase.....	54.41		55.60		57.36	

Are older transportation energy consumers different than younger ones? Curtin (1976) found an interesting fact about consumer adaptation to the energy shortages. When it came to transportation, the young felt they had not and could not adjust. However, the older persons who felt it would be difficult to adjust to household energy problems, stated they could adjust their energy consumption in relation to personal transportation.

Powell (1980) also found differences in older and younger consumers in a study that looked at energy management of household and transportation energy in Kentucky. She found that older persons scored significantly lower on energy attitude. Older persons also scored significantly lower on conservation knowledge. She also found that older consumers had significantly lower overall energy management scores than the younger consumer.

THE PROBLEMS

The elderly face varied transportation problems: total lack of transportation, lack of money for bus fares, or lack of available services to places they want and need to reach. For still others, it is the design and service features of the transportation that is available. Personal transportation is far more important than public transportation to the elderly (Revis, 1976). Most older Americans either walk or rely on their own or a friend's driving.

Brail, Hughes, and Arthur (1976) said that transportation problems of the elderly are compounded because they are poor and disadvantaged. They gave four reasons that the elderly are denied access to transportation: (1) they cannot afford to own an automobile or they cannot drive; (2) public transit is often not available; (3) if they do drive, they face a continual threat of losing their license or their insurance and (4) they are often physically unable to use the available transportation services. Part of this may be unjustified. Revis (1976) said the elderly driver has a better record than the average driver when calculated on the basis of accidents per driver. When calculating, however, on the basis of some measure of driving exposure or amount of miles driven, the elderly record is worse.

Wachs and others (1976) reported that chronological age alone does not explain the special transportation needs of the elderly. They contend that many current planning programs overemphasize the effects of physical aging when considering the special requirements of the elderly. Rather, the elderly are as heterogeneous as a younger population. It is a variety of lifestyles that influence transportation patterns

of the elderly. They identified elements of lifestyle: (1) Racial or ethnic background; (2) social living arrangements; (3) physical living arrangements; (4) economic resources; (5) educational attainment and (6) health. Financial security and ethnic identity were the most important aspects in relation to travel patterns. On the average, elderly residents of black and Spanish American communities traveled less frequently and were more dependent on public transportation. The results of their study also indicated that the ability to drive, the availability of an automobile, and the accessibility of public transportation were especially key aspects of maintaining a desirable lifestyle.

Cutler (1975) stated that aged consumers neither shared equally in the advantages offered by personal transportation nor were they equally able to overcome the obstacles posed in its absence. Functional impairments, difficulties in income maintenance, and characteristics of transportation systems themselves had erected significant barriers to mobility for a large segment of the elderly. Mobility restrictions were associated with low levels of life satisfaction. Older persons having personal transportation available to them had higher life satisfaction scores than those older persons not having transportation available for their use. Low levels of life satisfaction were especially characteristic of older persons who did not have personal transportation available and who lived more than one-half mile from the center of the city. For those living closer to the center of the city, life satisfaction was unrelated to transportation differentials. In essence the highest proportion of older persons with low life satisfaction scores was found among those who did not have personal transportation available to them, who lived at the greater distances, and who were of lower socioeconomic status or in poor health.

THE PRIVATE AUTO

The automobile is the primary source of transportation for the general population as well as for the older population. Dependence on automobile transportation becomes greater as a person ages. However, as people age, the availability of the automobile as a means of transportation decreases as both automobile ownership and licensing decline among the elderly. Nearly 40 percent of all households headed by an elderly person do not own an automobile (Harris, 1978).

The automobile is the key to mobility. In Kentucky, 74 percent of the elderly indicated that there was a car or truck in working condition in their household. However, females, the very old, the disabled, and the low income are the most disadvantaged. Only 65 percent of the females reported availability of an automobile, 50 percent of the low income, and 66 percent of the disabled. (Kentucky Elderly Needs Assessment, 1978.)

A sizable proportion of those older persons who had an auto in the household never drove it, or they were unlicensed. Of the 74 percent of older Kentuckians who had a vehicle in their household, nearly one-third never drove or were unlicensed, making them dependent upon others. Older women and the disabled elderly were especially

dependent upon other persons or other modes of transportation. One-half of the older women who had a working vehicle in the household did not drive or were unlicensed to drive while 40 percent of the disabled elderly did not drive or were unlicensed.

Most of Kentucky's elderly do manage, however, to have access to the vehicle in their household as evidenced by a majority of the elderly responding in the affirmative when asked if the vehicle was available for their use when they needed to go somewhere.

In a more specific and detailed study in Lexington-Fayette County, the most common type of transportation used by all respondents was again the private automobile. Rural and urban core residents, however, used the automobile considerably less than the suburban residents. In all cases the most frequent use of the private auto was as a driver and not as a rider. (Wellons and Kimsey, 1980.)

PUBLIC TRANSPORTATION

Three out of every five older persons responded that taxi service was not available to them. This was particularly true in the rural areas. This was reflecting what they perceived to be true and not what actually existed. However, it can be argued that a service is hardly a service if people do not know about it. Similarly, income also seems to be a factor influencing the use of taxi service.

Most of Kentucky's elderly stated that there was no public transit available in their area or at least they were not aware of it. The availability of public transit followed a trend similar to the availability of taxi service. Ninety percent of the persons residing in nonmetropolitan areas were without public bus service. Even when public transit was available it met elderly's needs only to a certain extent. One-half of the older population interviewed said they could get to "all" or "most" places using public transit. However, this figure decreased for the very old (41 percent) and the disabled (42 percent). One barrier to the use of public transit appeared to be the nearest bus stop. Only 57 percent of the elderly who had available bus service lived less than one block from the nearest bus stop. (Kentucky Elderly Needs Assessment, 1978).

MODAL CHOICES OF THE ELDERLY

How do the elderly get around? The 1978 Kentucky Elderly Needs Assessment study indicated that most older persons rode with family members, drove a car, and/or rode with friends. The least frequent travel mode choices were calling government workers, using public transit, riding in a taxi, and paying someone to drive them. There were also important differentials between males and females regarding the frequency with which the various modes of transportation were used. For example, the modes of transportation most often used for males were driving a car, riding with family members, walking, and riding with a friend. For females, on the other hand, the most popular modes were riding with family members, riding with friends, driving a car, and walking. The relative importance of "driving" between

males and females can be partially explained by the fact that of those females who had an auto available, only 50 percent said they drove, compared with 88 percent males. Income also influenced the frequency of usage for the various transportation modes. The most prevalent modes used by low-income elderly were riding with the family, riding with friends, walking, and driving a car. For middle-income elderly, the ordering of modes by frequency changed somewhat. The third most frequently used mode was driving a car, followed by walking. As might be expected, the high-income elderly drove a car most frequently, and they reported driving twice as often as the lower income group.

Government workers was the least used mode mentioned by all income groups; in fact, none of the high income elderly reported using this mode. Apparently, older persons seek all other options before calling a social worker. Conversely, the first place older people go for help is to their kin. This certainly seems to be the case of elderly Kentuckians with regard to transportation.

Only one-third of elderly persons were aware of special transportation programs in their area. An overwhelming majority of persons who were aware of special transportation programs never made use of them (87 percent for the State). The reasons given for not using the programs were as follows and presented in order of response: (1) They already had transportation; (2) did not need transportation, or (3) relatives and friends took them where they needed to go.

Specialized transportation programs are popular among those who use them. In fact, of those persons who used specialized transportation programs, the large majority gave them a positive rating.

TRANSPORTATION NEEDS

More than one out of five older persons in Kentucky, or over 104,000 elderly persons need additional transportation. By examining specific subgroups of the elderly we find that the poor and the socially isolated were most likely to need transportation services. For example: (1) More than one-third of the low-income elderly (36 percent), have difficulty going places; (2) nearly one-third of the socially isolated elderly (32 percent), have difficulty going places; (3) more than one-fourth of the disabled elderly (29 percent), elderly women (27 percent), and persons 75 years of age and older (27 percent), have difficulty going places; and, (4) of those older persons residing in nonmetropolitan areas, 22 percent have difficulty going places because they lack transportation.

Of those people reporting difficulty going places due to the lack of transportation, a large percentage of older persons reported difficulty going to both "essential" and "nonessential" places.

Moreover, of those persons reporting difficulty going places due to the lack of transportation, over 50 percent reported difficulty going shopping and seeing friends and relatives. Research findings consistently show that the presence of social relationships contribute to life satisfaction or adjustment in later life. Thus, these factors need to be taken into account when designing additional transportation programs. (Kentucky Needs Assessment Study, 1978.)

BARRIERS TO TRANSPORTATION USAGE

More than three-fourths of the elderly Kentuckians stated that the major barrier to usage of transportation services was not enough transportation services. This figure rose to 84 percent for the disabled, 83 percent for the socially isolated elderly, and 81 percent for elderly persons residing in nonmetropolitan areas. Thus, while a large number of older persons received transportation from their family, there still was a scarcity of opportunities.

The second most often mentioned barrier was the cost of transportation services. When specific subgroups of the elderly were examined, more than one-half of the elderly said this was a barrier (regardless of sex, income level, isolation-nonisolation, age, health, and metro-nonmetro residence categories).

Education was also an obstacle, although not to the same degree as other barriers mentioned. Nevertheless, not understanding how to use the services was mentioned by more than one-third of elderly Kentuckians. This figure rose to over 40 percent for males, low-income individuals, the socially isolated, and nonmetropolitan elderly residents. Not only do providers of services need to communicate the availability of their services, but also how to use their services.

One-half of Kentucky's elderly who had difficulty going to places due to lack of transportation, reported health as a barrier. It was difficult for 69 percent of the disabled and 56 percent of the very old to use transportation services because of their health.

With this in mind, it is not surprising that 44 percent of the elderly mention difficulty getting on and off the bus as a barrier. This figure rose to 64 percent of the very old (75 years of age and over) (Kentucky Needs Assessment Study, 1978).

URBAN AND RURAL DIFFERENCES

The differences between urban and rural transportation problems for older consumers are vast. McKelvey (1979) says that the major problem in rural transportation is overcoming the large distances between residents and their destinations. Rural residents are also almost totally dependent upon the private automobile. There is a total lack of transportation alternatives for the rural elderly, and those alternatives which are available, are often inefficient.

In urban areas the problem is more complex. There are two central questions who work in human services areas should ask: First, does the available transportation connect the elderly to their desired destination? Second, do the elderly actually reach those destinations? (Schmitt, 1979). Age alone is a relatively poor criterion for determining the transportation disadvantaged. Instead planners should consider the linkage between the older consumer and essential and desired goods and services.

RECOMMENDATIONS FOR TRANSPORTING THE ELDERLY

Brail and colleagues (1976) make several recommendations for transporting the elderly. Those alternatives range from simple, inexpensive approaches to more complicated programs. The total range of alterna-

tives, from the simplest to the most complex, include: (1) carpools. The organization of carpools has been a relatively popular method of transporting and may be particularly appropriate for the elderly; (2) occasional transportation. Volunteers generally drive once or twice weekly and may choose not to drive if it is inconvenient or if they are hesitant to travel in certain areas. This is generally limited to private, nonprofit, volunteer transportation programs; (3) regularly scheduled transportation. Such programs use one or more vehicles, ranging from sedans to buses, to transport daily to and from an activity center; (4) fixed route and schedule. Transportation supplied along an established route and at predetermined times characterizes a fixed route and schedule system; (5) advance reservation service. In advance reservation transportation service, a client telephones the dispatching office to make a trip request; (6) demand responsive transportation. These systems are generally characterized by shared rides and door-to-door service. The objective is to supply service at lower prices than conventional taxi service while maintaining the flexibility of taxi service.

Other recommendations that might be considered to meet the wide range of transportation needs of elderly consumers are: (1) subsidized programs to encourage local taxi companies to provide reduced fare structures for older persons; (2) information systems that publicize transportation problems of the elderly in order to encourage the use of formal and informal support systems; (3) government and public transit cooperation to expand and improve existing public transit services to the elderly.

An important recommendation made by Markovitz (1971) that cannot be overlooked or simplified is the need to coordinate housing programs for the elderly with transportation programs for the elderly. Quite often our system has provided housing programs and services for older consumers without the additional necessary planning for transportation services.

SUMMARY AND CONCLUSIONS

Transportation has been a major consumer concern for older persons in the past few years. It has particularly been a problem for females, the low income, the very old, and rural elderly. However, the problems of the elderly consumer are not homogeneous. The elderly, and their transportation problems, are as heterogeneous as the younger portion of society. Age alone is not the criterion for determining a disadvantaged transportation consumer.

In the future the elderly will be better educated, more affluent, more mobile, and able to enjoy a wider variety of lifestyles than the elderly of today. Yet they will continue to experience problems with availability and accessibility of transportation. It is also probable that the cost of transportation will remain one of the major barriers to transportation usage for the older person.

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TIME USE AND FAMILY LIFE

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The conventional wisdom is that American families have undergone substantial change in lifestyles during the past two decades. The change in lifestyles reflect increased participation of women in the labor force, increased diversity in family structures, decline in number of children per family, and increased orientation toward self. These lifestyle changes have commanded the attention of social scientists attempting to explain why these lifestyles have evolved and to predict future trends. An indicator of changing family lifestyles which has received substantial attention is the pattern of family time use.

Our affluent society has made available alternative uses of time. Certain household production activities, however, continue to demand time. Food preparation and cleanup, clothing care, care of family members, management, shopping, and maintenance of home and family possessions are indispensable to the functioning of families and society. One source of family stress is the conflict between "necessary" household work and alternative uses of time. This paper attempts to briefly review studies of changing family time use patterns with emphasis on changes in household work time. Following the review of major studies through the early 1970's the paper focuses on the methodology and preliminary findings of a multistate family time use study (NE113). Implications of these studies for future educational programs and research efforts are presented.

WHY MEASURE FAMILY TIME USE PATTERNS

One area of interest in the evolving patterns of time use is the attempt to "value" the nonmarket home production activities. Lawyers and insurance companies have become well aware of the need for accurate valuing of inputs to the maintenance of home and family as they seek to estimate monetary loss to families when a homemaker is incapacitated or killed.

In order to estimate monetary value of any homemaking activity it is necessary to know the time used and the "price" of that time. While the method of pricing different household activities has been somewhat debatable it is essential that the time component be measured accurately. Thus, accurate time use estimates provide a strong foundation for alternate methods of determining monetary value.

Enlightened family decisions about current and alternative time "expenditures" require an understanding of the present time "budget." Studies of family time use generate standards of comparison which allow families to measure their activity relative to others. While

the standards need not be considered desirable goals they are an aid in individual families' time management. Family members may also gain a greater appreciation of the current pattern of within family distribution of work. This provides a basis for examining the equity of the current distribution pattern. While this does not guarantee that families will move toward a more equitable distribution, it can provide a sensitivity to current inequities.

Beyond the individual family it has become clear that national productivity measures based solely on the market sector are deficient. Therefore, it is important to gain a better understanding of the extent of nonmarket production activities. Family time use studies do not entirely fill the gap in knowledge about nonmarket production but they begin to provide a sound knowledge base for determining the importance of household production activities.

FAMILY TIME USE STUDIES SINCE 1920

Time as a valuable resource and measurement of time use patterns have a long history. This section concentrates on studies in the United States after 1920 which are grounded in home economics research. For a brief review of literature from other social science disciplines see Ortiz (1979).

In the 1920's the U.S. Bureau of Home Economics developed guidelines for the study of women's time use. The studies completed using these guidelines concentrated primarily on farm women. Fortunately, farm work was separated from homework permitting later comparisons with urban households. Wilson (1929) reported that Oregon farm wives averaged 53.5 hours per week in household work. Wilson's study and two other early studies were compared with Wisconsin data collected in 1953 by Cowles and Dietz (1956). Wisconsin homemakers spent 53 hours per week in household work. Total homemaking time had remained remarkably constant in spite of rapid technological changes.

Vanek (1974) reported a summary analysis of approximately 20 time use studies. She attempted to determine if American women spent less time in housework than their grandmothers. Studies were reviewed from the 1920's through the 1960's. The early studies examined were those using U.S. Bureau of Home Economics guidelines. These studies were compared with contemporary data collected by the Survey Research Center, University of Michigan (Robinson and Converse, 1972). Vanek found that women who were not employed outside the home spent 52 hours per week in housework in 1924 and 55 hours per week in the 1960's. She found no difference between urban and rural women.

Managerial, shopping and family care time had increased while meal preparation and cleanup had decreased over the 50 years. Despite significant changes in laundry technology and easy-care fabrics the amount of time spent in laundry had actually increased.

Vanek reported that employed women spent 26 hours per week in housework in the contemporary period. She attempted to explain the 29 hours difference per week between employed and nonemployed women by differences in family characteristics, purchased household

services and help from family members. She found no support in the Robinson and Converse data for explanations based on these factors. Vanek concluded, "It appears that modern life has not shortened the women's work day. Farm work has been greatly reduced, but it has been replaced by work in the labor force. Indeed, for married women in fulltime jobs the work day is probably longer than it was for their grandmothers." (Vanek, 1973, p. 120)

The 1967 time use study of New York households, directed by Kathryn E. Walker of Cornell University, has become a classic study of family time use and its role in household production (Walker and Woods, 1976). Walker (1970) reported findings regarding time use patterns for household work and homemakers' employment at the 1970 National Agricultural Outlook Conference. The average time contributed by husbands in household work was 11 hours per week as compared to 51 hours for wives. Walker found that if the homemaker was employed 30 or more hours per week approximately 5 hours per day were spent in household work as compared to 8 hours per day for full time homemakers. In contrast, the husband's time remained the same, on the average, whether the homemaker was not employed, part-time employed, or employed 30 or more hours per week. Based on the 1967 results, Dr. Walker (1976) recommended that future time use studies consider four important variables: number of children, age of the youngest child, employment of wives, and husband's hours of paid employment.

INTERSTATE URBAN/RURAL COMPARISON OF FAMILY TIME USE

These previous studies led Dr. Walker and researchers in 11 States to conclude that a more comprehensive effort was needed. California, Connecticut, North Carolina, Virginia, Wisconsin, Oklahoma, Oregon, Texas, Louisiana, Utah, joined New York to form the northeast regional project 113: Interstate urban/rural comparison of families' time use.

Based on findings of the New York study in 1967 it was concluded that a relatively small sample of rural and urban families would be randomly chosen in each State. The sample was chosen to control for family size (two-parent, two-child) and to represent families where the youngest child was under 1, 2 to 5, 6 to 11, and 12 to 17 years of age. This would permit comparisons across States recognizing number and age of children as important variants to be controlled. Standardize procedures were developed so that day of the week and time of year could be equally represented in the sample. In each State 105 urban and 105 rural families were interviewed using standardized recall and dairy procedures. Time was recorded in 5- to 10-minute blocks for all family members over 6 years of age. Data were collected during 1977-78 time period.

Time does not permit an indepth discussion of findings from all States. With apologies to my colleagues in NE-113 the remainder of the paper discusses only selected findings. These include a limited discussion of raw time use patterns in housework and paid work across four States (New York, Wisconsin, Utah, Oregon). Also Sanik's work testing differences in rural and urban residence, geographic

location and a decade comparison with the original New York study are included. Lastly selected analyses of food preparation, division of labor, and children's contribution to household work are discussed.

Preliminary raw data comparisons

At this preliminary stage of analysis it seems most useful to present a comparison of raw findings for selected States and selected time use categories. Table 1 indicates minutes per day spent by all family members in housework and paid work. Average time spent in all household work by all family members was highest in New York with 678 minutes per day and lowest in Utah at 569 minutes. Within household tasks large raw score differences among these four States occur in nonphysical care of family members, shopping, housecleaning and household maintenance. Food preparation, shopping, and home maintenance were the highest time use categories in New York and Oregon. In Wisconsin, nonphysical care, shopping, and food preparation were highest. Food preparation, housecleaning and maintenance were leaders in Utah. In paid work time Wisconsin led with 570 minutes per day while New York was the lowest at 482 minutes.

Table 2 provides further detail on homemaker and spouse contributions. Homemakers in Utah averaged 397 minutes (for all household work), 59 minutes lower than New York. New York spouses averaged 145 minutes in all household work which is 38 minutes higher than Utah. Greatest differences among homemakers occur in housecleaning, nonphysical care and maintenance of car, house and pets. Greatest differences among spouses occurred in maintenance, nonphysical care, and shopping time. In paid work Wisconsin homemakers led with 117 minutes per day, 50 minutes higher than Oregon. Wisconsin spouses also led in paid work with 415 minutes per day, 21 minutes higher than Oregon.

Detailed rural urban comparisons

The raw score comparisons above provide only limited insight into family time-use patterns. Sanik (1979) has completed the most detailed analysis to date of current time use patterns in New York and Oregon. Using covariant analysis to compare the samples she found that a significant amount of variance in all household work by all family members was explained by State of residence. New York families spent 11.3 hours per day in all household work after adjustments for covariants while Oregon families used 10.4 hours per day. Homemakers in New York spent 7.7 hours per day while Oregon homemakers spent 6.8 hours per day in all household work. Rural families spent significantly more time per day only in physical care of family members. New York homemakers spent significantly more time in food preparation, dishwashing, clothing care and housecleaning. Oregon homemakers spent significantly more time in maintenance activities.

1967-77 comparisons in time use

Sanik's study also compared urban New York family time-use patterns for 1967 and 1977. She found in comparing two-parent, two-child families over the decade that no significant changes had occurred when considering all family members and all household work. Within house-

work categories for all family members she found that dishwashing and clothing care had declined significantly, while time in nonphysical family care and shopping had increased.

Homemakers' time decreased significantly in dishwashing and clothing care and increased significantly for shopping. Over the decade there was no significant change in all household work by homemakers. For spouses, nonphysical care of family members increased significantly as did contributions to all household work.

Recently, Sanik (1980) has completed a new analysis using the 1967-77 data (table 3). In this analysis appropriate measures were taken to more accurately weigh the data to conform to the population of two-parent, two-child families in the urban area of the study (Syracuse, N.Y.). Thus, the more recent results may more accurately represent changes in two-parent, two-child households over the decade. It was found that adjusted total family time in all household work decreased from 10 hours per day in 1967 to 9.8 hours per day a decade later—a nonsignificant change. Significant decreases occurred in dishwashing (0.9 to 0.8 hours) and clothing care (1.3 to 0.9 hours). While shopping time increased significantly from 1.2 to 1.7 hours.

Total contributions to housework by homemakers decreased significantly from 7.4 to 6.8 hours per day. Significant decreases occurred in dishwashing, clothing care and physical care of family members.

In contrast to her earlier analysis, Sanik found no significant change in total household work by spouses and no significant changes in the subcategories of household work. Apparently the new weighting method which resulted in a smaller weight for families with young children explains the difference in conclusions about spouses contribution to household work time. Sanik's results indicate that while homemakers' time decreased it continued to account for nearly 70 percent of total family time in housework while spouses' time accounted for slightly over 17 percent. These findings are consistent with previous studies indicating no major change in distribution of tasks among spouses.

Sanik's most recent analysis provided evidence of the impact of homemaker employment on homemakers' and spouses' time use. Sanik found that for each additional hour that a homemaker was employed per week outside the home she spent 4 minutes less in total household work. The greatest absolute decreases occurred in house care and clothing care. Spouse's time increased by $1/2$ minute per day in food preparation and 0.1 minute in dishwashing with no significant changes in other categories when the homemaker's employment increased by one hour per week. Sanik concluded that even when the homemaker is employed outside the home she still has the largest time commitment to household production.

Selected studies

Studies of meal preparation and food purchases away from home have been completed in Wisconsin and Utah. An analysis of the Utah data by Peterson (1979) indicated that meal preparation is still a task done mostly by the homemaker. Homemakers with some college education and those who were full-time homemakers spent more time in meal preparation than other homemakers. Rural/urban residence did not

affect the time in meal preparation. Employment of the homemaker was associated with a 17 minute per day reduction in meal preparation (84 to 65) and with spouses increase of 6 minutes more per day (5 to 11). Families with higher incomes, employed wives and those who lived in an urban area ate more meals away from home than other families. Families ate fewer meals together than expected and averaged being slightly less than one meal a day. It is interesting to note that families with the youngest children ate fewer meals together and those with preteens the most.

The Wisconsin data have been utilized by several researchers (Ortiz, 1979; Goebel and Hennon, 1979) to examine meal patterns and costs of food away from home. Employed homemakers were found to spend less time in food preparation and their families ate more meals away from home. There was no statistically significant effect of homemakers' employment and the number of persons served meals at home. Findings suggest that homemaker's education, family income, and the age of the youngest child influence the time in food preparation, the number of persons served, and the percentage of meals eaten away from home more than rural/urban residence. Consumption of time by the wife in employment was not significantly related to expenditures on meals away from home. There is a relationship between the age of the youngest child and expenditures for food away from home with families of older children expending more.

A study of the relationship between the structuring of the household division of labor and subjective satisfaction with the quality of life has recently been completed by Goebel, et al. (1980). Whether a couple had a more or less traditional division of labor was based on the percentage of total time spent by each of the couples in household work. The mean share of household work accounted for by the homemakers in the sample was 77 percent. Couples with divisions of labor falling below the mean were classified as less traditional and those above the mean as more traditional. The division of labor regarding work in and around the home was not a predictor of homemaker's and spouse's satisfaction with their family life. Apparently this objective domain is not an important determinant of subjective family life quality. The division of labor was, however, a predictor of homemaker's and spouse's satisfaction with how work around the house is shared. More couples differed than agreed on their reported satisfaction with the sharing of work. Among those who differed, it was the homemaker whose satisfaction was more frequently at the lower level.

Several studies in the NE-113 project have looked closely at children's contribution to household work. O'Neill (1978) found in a comparison of the New York 1967 and 1977 studies that both boys and girls contributed more time in 1977 than earlier and that boys' share was quite similar to girls in recent study. There was little evidence in the 1977 study to conclude that increased contribution by children is due to greater participation of women in the labor force. The children in the study (ages 6-17) spent a surprisingly large share of time for shopping, part of which may have been "recreational." Osbourne (1979) has analyzed children's time use in the Utah sample. She found that rural children contributed more time to household work than did urban children. The findings agree with those of O'Neill in that girls

did not contribute a significantly greater amount of time than boys. Osbourne reports that hours of parental employment and their time in household work did not substantially change children's contributions to housework.

Cogle (1980) has analyzed children's time in the urban Louisiana sample. She reported an average of 46 minutes per day spent by all children in household work. When mothers were employed fulltime (30+ hours), children spent the most time in household work (59 minutes). When mothers worked part time (1-29 hours) children contributed the least amount of time (23 minutes). Children of nonemployed mothers contributed 45 minutes per day.

CONCLUSIONS AND IMPLICATIONS

Several tentative conclusions can be reached from the family time use studies reported here. It is clear that women continue to provide the largest proportion of household work time. Total family time devoted to household work has not changed significantly for two-parent families with young children. In general, the husband's total contribution to household work does not appear to have increased significantly for these families.

It appears that for the specific tasks of management, shopping and child care greater amounts of time are being spent. Children seem to be contributing more time to housework although their time contribution does not appear to be increasing as a result of women's employment. Firmer conclusions will be possible when the NE-113 analyses are completed.

Several implications can be drawn from the studies to date. Conclusions will differ among time use studies depending on definitions of the sampling objective. The results reported here may appear inconsistent in some ways with those of the University of Michigan's national time use studies (Robinson, 1977). This inconsistency is primarily due to our examination of a single family structure and presents significant research opportunities for the future. As families become increasingly diverse in structure it will become important to examine time use for alternative structures. Our time use studies provide an important base for understanding home production. They leave many questions unanswered concerning how time inputs are translated into goods and services.

Family economics and management professionals will need to pay increasing attention to the many potential problems in family functioning which are created when time use alternatives interact with a fairly stable requirement for household labor. Family management specialists need to reemphasize effective time management techniques and to creatively explore new time use strategies.

Family economists need to examine the extent to which the possessions and consumption patterns of our affluent society have actually served to increase household work requirements. Energy scarcity and inflation have led to several proposals which imply increased home production. Our time use studies appear to indicate that a return to increased home production would fall disproportionately on the shoulders of women.

TABLE 1.—COMPARISON OF TOTAL FAMILY TIME-USE PATTERNS IN HOUSEHOLD AND PAID WORK IN SELECTED STATES, 1977-78

[In minutes per day]

	New York	Wisconsin	Utah	Oregon	Maximum difference
Food preparation	105	89	93	97	16
Dishwashing	145	44	38	36	9
House cleaning	76	54	193	68	39
Maintenance	96	80	92	112	32
Clothing care	140	36	25	28	15
Clothing construction	21	16	17	19	5
Physical care	72	65	70	73	8
Nonphysical care	92	100	53	64	47
Shopping	105	88	63	106	43
Management	26	139	29	33	13
All household work	1678	611	569	636	109
Paid work	482	1570	553	495	88

¹ Greatest time-use within category.

Source: Unpublished base data books for NE-113 contributing projects.

TABLE 2.—COMPARISON OF HOMEMAKER/SPOUSE TIME-USE PATTERNS IN HOUSEHOLD TASKS AND PAID WORK IN SELECTED STATES, 1977-78

[In minutes per day]

	New York	Wisconsin	Utah	Oregon	Maximum difference
Food preparation:					
Homemaker	83	72	79	78	11
Spouse	8	10	7	7	3
Dishwashing:					
Homemaker	38	36	31	29	9
Spouse	3	4	2	3	2
House cleaning:					
Homemaker	62	43	178	54	35
Spouse	3	4	3	2	2
Maintenance:					
Homemaker	24	28	29	37	13
Spouse	156	37	47	55	19
Clothing care:					
Homemaker	137	32	24	25	13
Spouse	1	2	0	1	2
Clothing construction:					
Homemaker	20	15	16	18	5
Spouse	0	0	0	0	0
Physical care:					
Homemaker	63	55	58	61	8
Spouse	9	9	10	9	1
Nonphysical care:					
Homemaker	60	166	34	39	32
Spouse	131	30	14	21	17
Shopping:					
Homemaker	155	47	37	54	18
Spouse	24	19	13	27	14
Management:					
Homemaker	16	123	15	19	8
Spouse	10	13	11	11	3
All household work:					
Homemaker	1456	416	397	414	59
Spouse	145	137	107	136	38
Paid work:					
Homemaker	77	117	82	67	50
Spouse	395	1415	412	394	21

¹ Greatest time use within category.

Source: Unpublished base data books for NE-113 contributing projects.

TABLE 3.—ADJUSTED MEAN TIME SPENT IN HOUSEHOLD WORK BY FAMILY MEMBER (NEW YORK 1977; 1967)

[Time in hours per day]

Task	Homemaker		Spouse		Total family ¹	
	1977	1967	1977	1967	1977	1967
Food preparation.....	1.4	1.5	0.1	0.1	1.6	1.6
Dishwashing.....	.6	1.8	.05	.04	.8	1.9
House care.....	1.5	1.5	.7	.7	2.7	2.6
Clothing care.....	.9	1.3	(2)	(2)	.9	11.3
Shopping.....	.9	.8	.3	.3	1.7	11.2
Management.....	.3	.2	.1	.2	.4	.4
Care of family members:						
Physical.....	.6	1.7	.1	.1	.7	.8
Nonphysical.....	.7	.6	.3	.3	1.0	1.2
Total ²	6.8	17.4	1.7	1.7	9.8	10.0

¹ Significantly different —0.05.² Less than 0.05 hr.³ Totals may not seem correct due to rounding when connecting minutes to hours.

Source: Sanik (1980).

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FAMILY STRENGTHS

(By Nick Stinnett, Department of Human Development and the Family,
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A prominent family life educator, Dr. Richard Klemer, once remarked that if we had a nuclear war today, when the danger was past and it was safe for us to come out of hiding that the first thing most of us would do would be to look for our families. Or we would look for people who were very close to us and were like family to us. This statement impresses on me that our family life is more important to us than we may realize. As we look back in history we see that the quality of family life is very important to the strength of nations. There is a pattern in the rise and fall of great societies such as ancient Rome, Greece, and Egypt. When these societies were at the peak of their power and prosperity, the family was strong and highly valued. When family life became weak in these societies, when the family was not valued, when society became extremely individualistic, the society began to deteriorate and eventually fell.

We have considerable evidence that the quality of family life is extremely important to our emotional well-being, our happiness, and mental health as individuals. We know that poor relationships within the family are very strongly related to many of the problems in society such as juvenile delinquency. Obviously, it is to our benefit to do what we can to strengthen family life and strengthening family life should be one of our Nation's top priorities. Unfortunately, it has not been a top priority.

On the newstand we see many books and magazine articles about what's wrong with families and the problems that families have. Many books predict that the family will disappear, that it is no longer meeting the needs of people. So much of what is written about families has focused on problems and pathology in family life.

Admittedly we need information about the problems, but we also need a balanced view. We need information about positive family models and what strong families are like. We need to learn how to strengthen families. We don't learn how to do anything looking only at how it shouldn't be done. We learn most effectively by examining how to do something correctly and studying a positive model. We have not had this positive model as much as we need in the area of family life.

In this Nation, we have many strong families. There has been little written about them because there has been very little research focusing on family strengths. It was with this in mind that we conducted the family strengths research project in Oklahoma. We are now doing this project on a nationwide basis. Some of the findings from the Oklahoma study follow. We are continuing to find similar results.

The things we have found are in agreement with what other researchers have found in other parts of the country. Our findings have implications for strengthening family life.

We had the assistance of the Cooperative Extension Service in Oklahoma to help identify the strong families in that study. We asked the home economics extension agent in each of the counties of Oklahoma to recommend a few families that they considered particularly strong families. The home economics extension agents were good professionals to recommend strong families for three reasons—their background training in family life, their concern for improving family life as part of their work, and the great amount of contact that they have with families in the community. Also, we gave the agents some guidelines for selecting the families. The guidelines were that the families demonstrated a high degree of marital happiness and a high degree of parent-child satisfaction as perceived by the extension agent and that the family members appeared to meet each other's needs to a high degree.

For purposes of this study, all the families were intact with husband, wife, and at least one child living at home. The first requirement for inclusion in this sample of strong families was the recommendation of the extension agent. The second requirement was that the families rate themselves very high in terms of marriage satisfaction and parent-child relationship satisfaction. One hundred and thirty families met these two conditions and were included in the sample of strong families. Both urban and rural families were represented in the sample although there were more families from small cities, towns, and rural areas than from large urban areas. In most instances, we found very little difference between the urban and rural families.

We gave all of these families questionnaires and later we interviewed a few of them. Our questions covered a broad range of factors concerning their relationship patterns. For example, we asked how they deal with conflict, about communication patterns, and about power structure. When we analyzed the multitude of information we found six qualities that really stood out among these strong families; six qualities that they had in common that seemed to play a very important role in the strength and happiness of these families.

THE SIX QUALITIES OF THE STRONG FAMILIES

APPRECIATION

The first quality of the strong families was certainly one of the most important qualities that we found. It emerged from many different questions and in many different ways that we were not expecting. The results were permeated by this characteristic. That quality is appreciation. These families expressed a great deal of appreciation for each other. They built each other up psychologically. They gave each other many positive psychological strokes, and made each other feel good about themselves.

Each of us likes to be with people who make us feel good about ourselves; we don't like to be with people who make us feel bad. One of the tasks of family counselors working with family members who make each other feel terrible is to get them out of that pattern of interaction and into a pattern where they can make one another feel

good. William James, considered by many people to be the greatest psychologist our country has ever produced, wrote a book on human needs. Some years after that book was published he remarked that he had forgotten to include the most important need of all—the need to be appreciated. William James felt that one of the most basic needs that you and I have is to be appreciated. There are so many things that we do for which we receive no reward other than appreciation. So perhaps we all need to work on our ability to express appreciation. One difficulty that we have about expressing appreciation is that we sometimes fear that people will think we're not sincere or that it's empty flattery. This need not be a concern. We can be sincere. Every person has many good qualities, many strengths. All we have to do is look for them, and be aware of them.

There are many ways that we can develop the ability to express appreciation and thus make our human relationships better and certainly improve the quality of our family life. One of these techniques that is widely used is one that Dr. Herbert Otto, chairman of the National Center for Exploration of Human Potential, has used and written about a great deal. It has also been a tool for many counselors and is now being used by families on their own. This is called the strengths-bombardment technique. It's very simple. Here is the way it operates. The entire family comes together. There may be a group leader or counselor or some member of the family can act as a leader. One person in the family is designated as the target person. For example, the mother may begin as target person. She is asked to list the strengths that she feels she has as a person. If she lists only two or three because she's modest, the leader can urge her to list others. After she has finished the list, her husband is asked to add to her list of strengths. Or he may elaborate on the strengths that she has already listed. When he has finished, each of the children is asked to add to mother's list of strengths. When this process is finished, the husband becomes the target person. The same procedure is repeated for him. Then each of the children becomes the target person.

The strengths-bombardment technique is very simple, but the results have been amazing. When families do this exercise, they become more aware of each other's strengths, and more aware of their strengths as a family. They get into a pattern of looking for each other's good qualities and they also get into a habit of expressing appreciation to one another. The result of this with so many families is that it makes their interaction with each other more positive. Some followup studies done with families who have gone through this activity show that the increased positive level of interaction is maintained for a period of time after the exercise has been completed. Many families are now using this technique periodically on their own.

SPENDING TIME TOGETHER

A second quality found among strong families is that they do a lot of things together. They spend a good deal of time together. It was not a false togetherness; it was not a smothering type of togetherness. They genuinely enjoyed being together. Another important point here is that these families structure their life styles so that they could spend time together. It did not just happen. They made it happen. And this

togetherness was in all areas of their lives—eating meals, recreation, and work.

GOOD COMMUNICATION PATTERNS

The third quality was not a surprise. The strong families have very good communication patterns. They spend time talking with each other. This is closely related to the fact that they spend a lot of time together. It's hard for people to communicate if they do not spend time with each other. One of the big problems facing families today is not spending enough time together. Dr. Virginia Satir, a prominent family therapist, has stated that often families are so fragmented, so busy, and spend such little time together that they communicate with each other through rumor. Unfortunately, that is too often exactly what happens.

Another important aspect of communication is that these families also listen well. They reported that their family members were good listeners and that this was important to them. The fact that family members listen to one another communicates a very important message—that is respect. They are saying to one another, "You respect me enough to listen to what I have to say. I'm interested enough to listen, too."

Another factor related to communication is that these families do fight. They get mad at each other, but they get conflict out in the open and they are able to talk it over, to discuss the problem. They share their feelings about alternative ways to deal with the problem and in selecting a solution that is best for everybody.

COMMITMENT

A fourth quality characteristic of these strong families was a high degree of commitment. These families were deeply committed to promoting each others' happiness and welfare. They were also very committed to the family group as was reflected by the fact that they invested much of their time and energies into the family. We have not had very much research on commitment and perhaps in recent years it has not been fashionable to talk about commitment.

Some of the best research on commitment has been done in communes. Some communes have been successful; others have not been. One of the main differences found between the two groups is commitment. Those communes that are the most successful, that last the longest, that are the most satisfying in terms of the relationships are those in which there is a great deal of commitment—to each other and to the group. Again, commitment in the communes was reflected in the amount of time the members spent together. The same was true with the strong families.

All of us are busy and we sometimes feel like we have so many things to do that we are pulled in a thousand different directions at the same time. The strong families experience the same problem. One interesting action that these families expressed was that when life got too hectic—to the extent that they were not spending as much time with their families as they wanted—that they would sit down and make a list of the different activities in which they were involved. They would go over that list critically and inevitably there were some things that they

really did not want to be doing, or that did not give much happiness, or that really were not very important to them. So they would scratch those activities and involvements off their lists. This would free time for their families, would relieve some of the pressure. As a result they were happier with their lives in general and more satisfied with their family relationships.

This sounds very simple, but how many of us do it? We too often get involved and it's not always because we want to be. We act so often as if we cannot change the situation. We do have a choice. An important point about these families is that they took the initiative in structuring their life style in a way that enhanced the quality of their family relationships and their satisfaction. They were on the offensive. They did not just react; they made things happen. We may have talked too much about families in the context of families as simply reactors in society, being at the mercy of the environment. In fact, there is a great deal that families can do to make life more enjoyable. These strong families exercised that ability.

HIGH DEGREE OF RELIGIOUS ORIENTATION

The fifth quality that these families expressed was a high degree of religious orientation. This agrees with research from the past 40 years, which shows a positive relationship of religion to marriage happiness and successful family relationships. Of course, we know that there are persons who are not religious who have very happy marriages and good family relationships. Nevertheless a positive relationship between religion and marriage happiness exists according to the research that we've had for many years. These strong families went to church together often and they participated in religious activities together. Most of them, although not all of them, were members of organized churches. All of them were very religious.

There are indications that this religious quality went deeper than going to church or participating in religious activities together. It could most appropriately be called a commitment to a spiritual life style. Words are inadequate to communicate this, but what many of these families said was that they had an awareness of God or a higher power that gave them a sense of purpose and gave their family a sense of support and strength. The awareness of this higher power in their lives helped them to be more patient with each other, more forgiving, quicker to get over anger, more positive, and more supportive in their relationships. Many of the values emphasized by religion when put into action can certainly enhance the quality of human relationships. Dr. Herbert Otto has observed we could spend more time looking at the spiritual aspects of developing human potential and perhaps developing family strengths. For these strong families, religion played a major role in their family strengths.

ABILITY TO DEAL WITH CRISES IN A POSITIVE MANNER

The final quality that these families had was the ability to deal with crises and problems in a positive way. Not that they enjoyed crises, but they were able to deal with them in a constructive way. They managed, even in the darkest of situations, to look at the situation and to

see some positive element, no matter how tiny and to focus on it. It may have been for example, that in a particular crisis they simply had to rely to a greater extent on each other and a developed trust that they had in each other. They were able to unite in dealing with the crisis instead of being fragmented by it. They dealt with the problem and were supportive of each other.

RECOMMENDATIONS

It is interesting that most of these qualities that we found to characterize strong families have been found to be lacking in families that are having severe relationship problems, and in families broken by divorce. This fact supports the validity of the findings and suggests the importance of these qualities in building family strength. How can we translate this information into help to strengthen families? What kind of recommendations can we make? What can we do?

1. One recommendation is to help families develop some of these skills, such as the ability to express appreciation and good communication patterns. If we were able to do that relationships could be improved and the quality of family life could be made better.

2. A second recommendation that we could make is to have a comprehensive human relationships education program incorporated at the preschool, elementary, secondary, and college levels. Isn't it amazing that we have not already done that? Good human relationships are basic and vital to our happiness, our well-being and our mental health.

3. Another recommendation that we could make to strengthen families is to conduct further research which identifies the characteristics of strong families. We've hardly begun. We need research on a national basis. We need to research family strengths in alternate family forms. We need research on the strengths of single-parent families, and on families in different ethnic groups.

4. Also, if we are truly serious about strengthening family life we might make more of a concerted effort to improve the image of family life. Perhaps we need to make commitment more fashionable. We are very much influenced by fashion. Some psychologists have stated that if we are really serious about strengthening family life, we are going to have to build much more prestige into being a family member, in being a good father, mother, wife, or husband. We are influenced tremendously by what we think we are rewarded for.

Perhaps we could improve the image of family life through some television spots like public service announcements. The Mormon Church, for example, has done an excellent job of this. They have some very effective television spots. These short announcements could communicate messages about the importance of expressing appreciation, or the importance of parents listening to their children, for example.

5. Finally, in terms of recommendations for strengthening family life, another thing that we are going to have to do is reorder our values and priorities. We will have to make family life and human relationships a top priority. We also will need to make family life and human relationships a top priority in terms of the way we spend our time and our energy.

Family life today can be strengthened and made much better. There is great potential and we can do it.

FOOD ORIENTATION BY POPULATION GROUPS

(By Ellen Haas, Community Nutrition Institute)

Since the days of Marco Polo, researchers have known that different population groups eat different foods. Largely dependent upon available food production resources, the cultures of the world have developed a wide array of extremely different dietary patterns.

In the land-poor island country of Japan, fish and other seafood has long been a staple. In swampy Southeast Asia, rice has been the principal starch for millennia. In lush New Zealand, inexpensive dairy products have always been an important part of the diets of relocated Europeans. On the Argentinean pampas, range fed beef has been important. In tropical Central America, fruit has been a dietary focal point. The list is long; nearly every different cultural group has adopted and maintained a different dietary pattern.

In recent years, however, efforts have been made, particularly in the United States, to further define the dietary trends among one culture or within one nationality. These efforts have largely stemmed from the desire, on the part of food manufacturers and marketers, to subdivide the overall consumer food market according to knowledge and behavior so that separate marketing strategies can be devised and conducted for each individual group. On this basis, marketing itself is likely to be more successful. Thus the concept of "market segmentation" was born.

Perhaps the most telling example of how this market segmentation strategy has been utilized is the capitalization on the limited knowledge and self-gratification tendencies of children to market heavily sweetened breakfast foods directly through a favorite amusement medium—the television. But it certainly isn't the only example. One only needs to look around to see market segmentation at work for the food industry—selling convenience food to working mothers, beer to armchair quarterbacks and firefighters, and yogurt to the health conscious.

But market segmentation can also play a role from the perspective of public policy. A recognition of this fact stems from the discovery that inappropriate diets have either caused or made worse health problems among certain subgroups of the national population. An understanding of the dietary knowledge and patterns of these groups could likely lead to the structure of nutrition education programs to help increase knowledge and modify behavior in the direction of better health.

One way market segmentation has been put to work has been to split up the population according to socioeconomic or demographic groups. For example, a 1980 Yankelovich, Skelly, and White survey reported that:

Low-income people are more likely to be unconcerned about nutrition, are less likely to have made healthful changes in their diet, and are more likely to have a casual attitude toward eating habits.

Senior citizens are less likely to be concerned about nutrition than the general population, reflecting both advanced age and lower socio-economic status.

Minority group members are more likely to have a serious attitude toward diet and to be more concerned about nutrition than the general public. However, they are less likely to have actually made healthful changes in their eating habits.

Parents are more concerned about nutrition but face difficult barriers to improving diets—including limited food budgets, different eating schedules, and the difficulty of pleasing all family members.

Through the identification of common habits and barriers, publicly funded nutrition education programs can be structured which address the key problems of these different demographic groups and encourage or enable them to develop more healthful eating patterns.

One example of how market segmentation can actually be put to work for public policy purposes is provided by the nutrition education research program currently being developed jointly by the Community Nutrition Institute and the Marketing Science Institute. Essentially, the CNI/MSI project will develop and test the importance of a community based nutrition education campaign—planned and carried out with the active participation and continuing involvement of diverse community leaders—that is keyed to the specific predominant nutrition needs of the target community. Those predominant nutrition needs moreover, will be determined through a process which identifies prominent dietary and lifestyle trends among community members and then segments the community members into clusters on the basis of similar behavior patterns. This information will provide the basis for a better understanding of targeted community members.

In reality CNI will use a number of means to segment the community into clusters. But one important tool for this process will be a community knowledge and behavior "pretest" based on a national survey instrument that was developed in the first phase of this research effort. That national survey sought to determine levels of nutrition knowledge, nutrition concern, and dietary practices throughout the U.S. population. In that survey we analyzed sources of information on nutrition and the adequacy of that information for individuals. And then, using the USDA/HHS Dietary Guidelines, we were able to segment or cluster individuals according to dietary practices and knowledge.

From this segmentation of individuals on a nationwide basis, five separate profiles emerged which distinguish different food consumption patterns for 95 percent of the survey population. These profiles also distinguish among the variables which are considered to be determinants of consumption behavior.

Through the survey we were able to define five profiles. Highlights of the segments include the following:

Segment 1.—Representing the "typical" consumer in the United States, this segment constitutes 40 percent of the survey population.

This group places greatest dietary emphasis on obtaining proper amounts of vitamins, minerals, and protein and considers the family budget and food preferences to be very important in buying food. Key concerns are inflation, weight control, and concern about additives and preservatives. Level of knowledge about nutrition is moderate to strong; the desire for more information is also strong.

The protein sources most frequently used by segment 1 consumers are hamburger, hot dogs, luncheon meats, chicken, and tuna. The most frequently used vegetables are potatoes, onions, and salad greens. Favorite fruits are apples, bananas, and oranges. Whole wheat bread is used more frequently than white bread. Cereals are also a relatively important part of the diet, while other grain products are infrequently used. Margarine is more frequently used than butter. Compared to the average, this segment shows a greater usage of skim as opposed to whole milk.

Segment 2.—Containing 25 percent of the survey group, segment 2 members are less concerned than average about nutrition and tend to regard budget or family preferences as especially important criteria in food purchase decisions. The group is particularly oriented toward meat and dairy products. It includes persons which, on the average, have less education, earn lower incomes, are generally younger, and have relatively more children.

Segment 3.—Accounting for 15 percent of the survey population, this segment is heavily oriented toward processed foods and thus experiences a very high intake of salt. The group members also have a preference for confections, including cookies, cereals, and snacks.

Segment 4.—Accounting for 15 percent of the surveyed individuals, this group represents the portion of the population which has already incorporated the practices of dietary guidelines into their behavior. The group is highly concerned about nutrition and the most likely to consider nutrition-related factors as important food purchase criteria. Nutrition knowledge levels are the highest among the five segments. Poultry is preferred to red meat; eggs and whole milk are used infrequently. Whole-grain breads are favorite foods, as are different varieties of fruits and vegetables.

Segment 5.—Individuals here are relatively unconcerned about nutrition and do not feel the need for more information. Their hallmark is the extensive consumption of animal proteins such as beef, lamb, and fish. The group also likes vegetables and consumes a moderate amount of sweets.

In essence, the study identified five basic segments of nutritional practices which could be useful in planning nutrition intervention activities, for both individuals and groups of individuals. In our case, the profiles have demonstrated that it is possible to identify consumer segments of the population with similar likes and dislikes in food and food products, in nutritional concerns, in attitudes toward nutritional data and in menu planning and food preparation; and, interestingly, to present these determinants in relation to the health objectives of the individual consumer.

The next stage of our research will be to test a nutrition education program utilizing these techniques. As I noted earlier, we intend to

conduct nutrition education campaigns in selected community settings which are keyed directly to the predominant nutrition needs and awareness levels of community members—based on a pretest to determine community segments, and on a community assessment to obtain data on groups within the specific communities.

In conclusion, we feel market segmentation can be a useful tool for targeting population subgroups and delivering information keyed to their specific interests and concerns. Clearly, this technique should provide assistance to nutrition educators in developing more responsive and hopefully more effective programs.

The food industry knows how useful market segmentation is. Through our work and that of others, this important conceptual tool will hopefully become a standard instrument in efforts to target and service the nutritious needs of specific groups within the population.

AN INVESTIGATION OF ADDED SUGAR AND SALT CONSUMPTION PATTERNS

(By Jane Goodman, John Goodman, Howard Schutz,
Marc Grainer, and Elizabeth Megna)

INTRODUCTION

Assuring that the population's minimum nutrient needs were met was a very necessary objective of nutrition policy for many years. As great progress has been made in this area, numerous problems beyond assurance of needs have arisen. The avoidance of overnutrition or of excess consumption of certain food components has emerged as a major nutritional problem in this country.

It is around this latter set of problems that the recent debate over the consumption of foods high in sugar, salt, and fat (HSSF foods) has arisen. Both Congress (U.S. Senate Select Committee on Nutrition and Human Needs, 1977) and the U.S. Department of Agriculture (USDA/DHEW, 1980) as well as the popular press have addressed this issue. In response to this debate, suggestions have been made that Americans should reduce their consumption of HSSF foods. For example, "Dietary Goals for the United States" (U.S. Senate Select Committee on Nutrition and Human Needs, 1977) recommended significant reductions in the consumption of sugar, salt, and fat.

Researchers have only recently addressed the area of HSSF foods. Some research has been conducted on the impact of HSSF item selection on health (Gori, 1977; Vergroesen, 1977; Connor and Connor, 1976; U.S. Senate Select Committee on Nutrition and Human Needs, 1977). Other works have reported per capita intake of HSSF items (National Research Council, Food and Nutrition Board, 1974; USDA, 1976; "Fat in Today's Food Supply—Level of Use and Sources," 1975).

Many issues remain to be studied. For example, techniques for measuring HSSF consumption must be improved. Consumption of specific food items containing high levels of sugar, salt, and/or fat, as well as the practice of adding SSF at the table need to be addressed. The factors that motivate consumption (cost, convenience, taste, nutrition knowledge, et cetera) of HSSF foods need further investigation. Also, population segmentation techniques should be utilized to identify the HSSF users. (Policies designed to reduce HSSF consumption can only be effective when directed at the appropriate population segments.)

Technical Assistance Research Programs Institute (TARP) was awarded grant No. 9-0258-0 from the USDA, Science and Education Administration, human nutrition program to conduct an exploratory study of these issues. TARP used a mail survey data collection methodology in this study. The survey data is now being analyzed, and findings will be reported in a series of articles in papers to be released early next year.

This paper addresses preliminary findings from that phase of the study which deals with adding sugar and salt at the table.¹ Three sets of issues are explored:

Daily levels of added sugar and salt consumption;

Preliminary population segmentation of added sugar and salt users—demographic segmentation, eating habit segmentation;

Relationship between nutrition knowledge and consumption of added sugar and salt.

The findings being reported are based on a preliminary analysis of the survey data. Because of space limitations, they are meant to be illustrative rather than comprehensive. More detailed analyses of this topic will be reported in subsequent publications.²

RESEARCH ISSUES

Daily levels of added sugar and salt consumption.—There are four ways sugar and salt find their way into the food people eat. They may be found in a food item in its natural state. They may be introduced during processing or preparation. Or, they may be added by the consumer at the table. Consumer practices of adding sugar,³ and salt while at the table are the subject of this paper. Three primary reasons account for interest in this subject.

First, nutrition folk wisdom suggests that the amount of sugar and salt introduced at the table accounts for a substantial percentage of the suggested daily intake of these items. This folk wisdom needs empirical validation. If true, added SSF practices should be targeted as a high priority for nutrition education programs, and nutrition policy should be tailored to discourage excessive consumption of added sugar and salt.

Second, consumption of added food items may be of interest even when they do not constitute a large percentage of the recommended daily intake of sugar or salt. This is the case where a population consumes sugar and salt at a level above the recommended daily standard. Here priority would be given to cutting back on added sugar or salt intake in an effort to meet the overall consumption guidelines.

Third, the issue of consumer awareness is an important factor. Lack of consumer awareness is a major barrier to decreasing the consumption of sugar and salt. Most consumers do not know how much sugar or salt have been introduced by the processor or the preparer. They are likewise unaware of the natural levels of sugar and salt found in food items. It is difficult for consumers to decrease sugar and salt consumption if they do not know on which food items to cut back.

Consumers can, however, accurately estimate the amount of sugar and salt they add at the table. Such awareness provides consumers with a basis for translating the lessons of nutrition education into positive action. Therefore, once motivated to cut back on sugar and salt, consumers can do so by simply modifying their table behavior.

¹ As noted above, suggestions have been made that the consumption of sugar and salt should be decreased. Evidence has been marshaled on both sides of this issue. Further research will be needed before this question is finally settled. For purposes of this paper, however, TARP will assume that it is the aim of the nutrition policymaker to decrease overall per capita consumption of sugar and salt.

² TARP investigated added fat (butter and margarine) practices under sponsorship of the USDA grant. However, the added fat data was not available in time to be included in this paper. It will be presented in subsequent reports and publications.

³ For purposes of this study, sugar was defined as sucrose.

Mail survey respondents were asked to report their average daily consumption of added sugar and salt. Sugar intake was measured in teaspoons, while salt consumption was recorded in shakes. Mean consumption rates were calculated.⁴

Preliminary population segmentation of added sugar and salt users.—Population segmentation techniques are used by marketing professionals when designing campaigns to sell products. The product's market is subdivided into those population segments that constitute the best potential customers. Sales campaigns are then tailored to fit the particular characteristics of the targeted population segments. Different combinations of media and messages are used to sell differing market segments. Population segments are defined in terms of demographics, lifestyle factors, and/or psychographics. Population segmentation techniques can be used in a similar manner when addressing the problem of added sugar and salt consumption.

A segmentation analysis can first be used to identify which groups of the population have the most serious problems. These would be population groupings that report the highest daily added sugar and salt usage. Scarce nutrition education resources can then be targeted at these problem population segments.⁵ Once the problem populations are identified, segmentation data can then be used to design appropriate nutrition education programs. These public information campaigns would be tailored to fit the differing characteristics of the targeted population groups. (For example, a campaign directed at elderly urban residents in the Middle Atlantic region who suffer from hypertension would use different styles of messages and media from a nutrition education program aimed at teenage students living in the Pacific region.)

The segmentation began with a review of such standard demographic characteristics as age, sex, race, geographic region, and family income. Next, the mail survey respondents were segmented according to their eating habits. They were subdivided by where they ate their meals (at home/outside the home, fast food outlets, vending machines, or traditional restaurants⁶) as well as by their snacking practices.⁷

⁴ Waste was not factored into the consumption of added sugar and salt. Waste could not be accurately measured using simply a mailed questionnaire. The mean consumption rates assume that all added sugar and salt was eaten. Therefore, the levels of added sugar and salt reported may be slightly overstated.

⁵ In an ideal world, nutrition education campaigns would be designed to address the added sugar and salt problems of all major population segments. However, adequate resources for such a comprehensive treatment are not likely to be available. Population segmentation techniques are therefore used as a method for setting nutrition education priorities. Further, a mass information campaign, not tailored to the needs of specific population segments, may not be effective.

⁶ The following question was used to determine where people eat their meals:

Now I would like to ask you some questions about your eating habits. For each of the activities below, please "X" the box which best describes the number of times per week spent on that activity.

	Number of times per week			
	0 or 1 time	2 or 3 times	4 or 5 times	Everyday
Eat meals away from home.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Eat or take out in fast food restaurants.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Eat from vending machines.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Eat in dining room restaurant.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

⁷ Snacking practices were measured using the following question:

About how many times a day do you ordinarily "snack"—that is, eat between meals? (Please "X" one box.)

Never 1
 1 to 2 times a day 2
 3 to 4 times a day 3
 5 to 6 times a day 4
 More than 6 times a day 5

Each of these factors was cross tabulated with the total mean daily usage of added sugar and salt. Where statistically significant differences (at the 0.05 level⁸) were reported between these two sets of variables, those population segments with the highest usage of sugar and salt were identified. These were designated the problem populations.

Relationship between nutrition knowledge and consumption of added sugar and salt.—If nutrition education does not affect food consumption patterns, there is no need to employ population segmentation techniques. This is because the population segmentation analysis is based on the assumption that properly designed nutrition education programs will motivate consumers to decrease their consumption of added sugar and salt.

In an effort to determine the relationship between nutrition knowledge and the consumption of added sugar and salt, TARP developed a nutrition IQ index. This index was based on the answers to 14 nutrition knowledge questions. It was designed to measure the consumer's overall nutrition knowledge. Respondents to the mail survey were awarded one point for each question they answered correctly. Scores on this index could range from 0 to 14. The respondent's nutrition IQ was rated low (0-9), medium (10-12), or high (13-14).⁹

⁸ Differences were only reported where an F test indicated a significant difference for between groups at the 0.05 level or less.

⁹ The 14 items used in the nutrition IQ index are presented below. The correct answers are indicated by "X's":

Now I would like to ask your opinion about a variety of food-related statements. Please "X" the box across from each statement telling me whether you agree or disagree with that statement.

Statements	Agree	Disagree
Pregnant women and growing children can get calcium from other foods if they don't like milk products.....	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
Iron is one of the substances needed to make healthy blood.....	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2
Fruits and vegetables are better sources of vitamins than pills and tablets.....	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2
In order to be really nutritious, a meal needs to include meat.....	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
Steak has better protein than stew beef.....	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
The calcium in skimmed milk is just as good as that in whole milk.....	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2
Adults don't need milk.....	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
As long as a person has meat and potatoes most days, he is well-nourished.....	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
Everyone really ought to take a vitamin pill every day.....	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
Cindy went to eat breakfast in a restaurant with her friends. She ordered two waffles with syrup, bacon, hash brown potatoes, and coffee. How would you rate Cindy's food choice? Place an "X" in the box which best describes your opinion of Cindy's meal.		
She made a good choice.....	<input type="checkbox"/> 1	
A better choice would be two waffles with syrup, bacon, hash brown potatoes and milk.....	<input type="checkbox"/> 2	
She should not have ordered the hash brown potatoes.....	<input type="checkbox"/> 3	
A better choice would be two waffles with syrup, milk and one-half of a grapefruit.....	<input checked="" type="checkbox"/> 4	
Don't know.....		<input type="checkbox"/> 5
Which of the following statements describes your opinion of sugar? ("X" as may apply.)		
More nutritionally complete than starches.....	<input type="checkbox"/> 1	
Producer of tooth decay.....	<input checked="" type="checkbox"/> 2	
Higher in calories per gram than starches.....	<input type="checkbox"/> 3	
A good source of vitamins and minerals.....	<input type="checkbox"/> 4	
Don't know.....	<input type="checkbox"/> 5	
In preparing meats, which one of the following methods would be lowest in calories? (Please "X" one box.)		
Pan fry.....	<input type="checkbox"/> 1	
Deep fat fry.....	<input type="checkbox"/> 2	
Broil.....	<input checked="" type="checkbox"/> 3	
Shake and bake.....	<input type="checkbox"/> 4	
Don't know.....	<input type="checkbox"/> 5	
In your opinion, does whole milk have more calcium than skimmed milk?		
Yes.....	<input type="checkbox"/> 1	
No.....	<input checked="" type="checkbox"/> 2	
Don't know.....	<input type="checkbox"/> 3	
Which of the following statements best describes what protein is? (Please "X" only one box.)		
A type of food which gives the most energy.....	<input type="checkbox"/> 1	
A substance found only in meats.....	<input type="checkbox"/> 2	
A substance found in food which is necessary for growth and building of tissue.....	<input checked="" type="checkbox"/> 3	
Don't know.....	<input type="checkbox"/> 4	

The results of the nutrition IQ were cross tabulated with the total mean daily consumption of added sugar and salt. A negative relationship between these two sets of variables would mean that the higher the nutrition IQ, the lower the consumption of added sugar or salt. Such a relationship would support the case for nutrition education. If nutrition knowledge is not associated with decreased consumption of added sugar and salt, the role of education would be called into question. In this context, nutrition education is only a useful tool if knowing the dangers of excessive added sugar and salt motivates decreased consumption.¹⁰

METHODOLOGY

The data base for this study was collected by conducting a survey of members from the Market Facts Consumer Mail Panel. This panel is a pool of approximately 100,000 households located throughout the country. These households contain more than 200,000 individuals who are potential survey respondents. The panel is a representative sample of the Nation's population.

A sample of 2,400 panel members was selected for the survey. The sample was drawn from those panel members 15 years of age and older. Each of these panel members was sent a 6-page questionnaire. The survey was fielded during the summer of 1980; 1,765 panel members responded to the survey, for a response rate of 73.5 percent. A comparison of respondent and nonrespondent demographics did not indicate evidence of response bias.¹¹

ADDED SUGAR

Daily level of added sugar consumption.—In 1972, the average consumption of sugar by Americans was 124 grams per day (Sipple & McNutt (1974). This converts into a daily average of nearly 470 calories. Whether this consumption level is too high is the subject of considerable debate (Connor and Connor, 1976; Keys, 1971; Yudkin, 1972). Cohen (1973) proposed that no more than 5 percent of one's calories should come from sugar, while the U.S. Senate Select Committee on Nutrition and Human Needs (1977) recommended a limit of 10 percent.¹²

Daily added sugar usage was calculated on the basis of the answers by the mail survey respondents to the following question:¹³

How many teaspoons of sugar do you use at each meal? (Write in number of teaspoons below, if none, write in "0".)

Meals:	Number of teaspoons (Write in)
Breakfast	_____
Lunch	_____
Dinner	_____

Daily added sugar intake was the sum of the teaspoons used for breakfast, lunch, and dinner. Table 1 reports added sugar practices by meal.

¹⁰ Differences were only reported when an F test indicated a significant difference for between groups at the 0.05 level or less.

¹¹ A more detailed description of the mail survey methodology is reported in TARP, 1981.

¹² Guthrie (1979) concluded that given the present state of the art it was not possible to develop recommended levels for sugar consumption.

¹³ This is an extremely conservative estimate of added sugar usage. It does not include added sugar intake resulting from snacks (e.g., coffee breaks).

TABLE 1.—DAILY ADDED SUGAR CONSUMPTION
[By percentage]

Teaspoons added:	Meal		
	Breakfast	Lunch	Dinner
0	57.6	82.2	76.2
1 to 3	38.1	12.6	19.2
4 and over	4.3	5.3	4.6

The total mean daily added sugar intake was 1.3 teaspoons. Mean daily added sugar consumption for breakfast, lunch, and dinner was 0.73, 0.23, and 0.34 teaspoons, respectively. The range of added sugar intake for each meal was: 0–10 teaspoons for breakfast, 0–6 teaspoons for lunch, and 0–8 teaspoons for dinner. The total mean daily added sugar intake for just those respondents reporting added sugar usage was 5.1 teaspoons.¹⁴

Assuming an average daily intake of 2,500 calories, the 10 percent standard of the U.S. Senate Select Committee on Nutrition and Human Needs allows for the consumption of 250 sugar-based calories. The total mean daily added sugar usage was only about 20 calories, or less than 10 percent of this allowance. The total mean daily added sugar usage accounted for more than 15 percent of the Cohen allowance. The importance of added sugar consumption is enhanced, however, when it is recognized that Americans consume nearly double the recommended level of sugar.

More than half of the added sugar reported was consumed at breakfast. Therefore, if nutrition education programs are designed to address added sugar usage, special emphasis should be given to breakfast-related eating patterns.

Preliminary demographic segmentation of added sugar users.—When the respondents were segmented according to age, sex, race, and family income, there were significant differences between the mean daily added sugar usage reported by the resulting population segments. Tables 2–5 present these findings. The problem population segments that need nutrition education included consumers under 25 years of age, men, blacks, and those with family incomes that range between \$10,000 and \$15,000. No such differences were evident when the respondents were segmented by geographic region.

TABLE 2.—*Added sugar users segmented by age*

Age (in years) :	Mean daily consumption of added sugar (in teaspoons)
Less than 25	1.6
25 to 34	1.2
35 to 44	1.1
45 to 54	1.1
55 to 64	1.2
65 and over	1.2

¹⁴ When deriving this mean, the respondents who did not add sugar at the table were dropped from the calculation.

TABLE 3.—*Added sugar users segmented by sex*

Sex :	Mean daily consumption of added sugar (in teaspoons)	
Male	1.6	
Female	1.0	

TABLE 4.—*Added sugar users segmented by race*

Race :	Mean daily consumption of added sugar (in teaspoons)	
White	1.2	
Black	2.4	

TABLE 5.—*Added sugar users segmented by family income*

Family income (in dollars) :	Mean daily consumption of added sugar (in teaspoons)	
0 to 5,999	1.3	
6,000 to 9,999	1.4	
10,000 to 14,999	1.5	
15,000 to 19,999	1.1	
20,000 to 29,999	1.2	
30,000 and over	1.0	

Preliminary eating habit segmentation of added sugar users.—When the respondents were segmented by general eating out patterns, fast food patronage, vending machine utilization, and snacking practices, there were significant differences between the mean daily added sugar usage reported by the resulting population segments. Tables 6-9 present these findings. The problem population segments included those consumers who eat away from home as well as those who patronize fast food restaurants and vending machines four or more times per week. Those who snack five or more times per day also reported high added sugar usage. Significant differences were not reported when respondents were segmented by traditional restaurant patronage.¹⁵

TABLE 6.—*Added sugar usage segmented by general eating out patterns*

Number times per week eat away from home :	Mean daily consumption of added sugar (in teaspoons)	
0 to 1	1.1	
2 to 3	1.3	
4 and over	1.4	

TABLE 7.—*Added sugar usage segmented by fast food patronage*

Number times per week patronize :	Mean daily consumption of added sugar (in teaspoons)	
0 to 1	1.2	
2 to 3	1.3	
4 and over	1.9	

¹⁵ Such findings suggest strategies for tailoring nutrition education campaigns to best reach these problem population segments. For example, notices cautioning against added sugar usage could be put in restaurant menus. Signs warning against the danger of excessive sugar usage might be put up in fast food restaurants or near vending machines.

Manufacturers of snacking products (coffee, candy, etc.) could put messages in their advertising warning against excessive added sugar usage. (This would be a form of defensive advertising. By acting to decrease added sugar usage, manufacturers might diffuse some of the criticism directed against their products.) Similar nutrition education messages could be put on snack product packaging.

As a more direct remedial action, sugar could be taken off the tables of restaurants and placed in a central location.

While the practicality of these examples depends on the unique facts of any specific case, they illustrate how the eating habit segmentation data can be used.

TABLE 8.—*Added sugar usage segmented by vending machine utilization*

Number times per week patronize:	Mean daily consumption of added sugar (in teaspoons)
0 to 1	1.2
2 to 3	1.2
4 and over	2.3

TABLE 9.—*Added sugar usage segmented by snacking practices*

Number of times per day:	Mean daily consumption of added sugar (in teaspoons)
0	1.0
1 to 2	1.2
3 to 4	1.7
5 and over	2.0

Relationship between nutrition knowledge and consumption of added sugar.—Table 10 reports the relationship between the nutrition IQ index and the consumption of added sugar. The highest IQ scores were associated with the lowest daily added sugar usage. This relationship supports the validity of nutrition education.

TABLE 10.—*Relationship between nutrition IQ and consumption of added sugar*

Nutrition IQ:	Mean daily consumption of added sugar (in teaspoons)
Low	1.6
Medium	1.1
High	1.0

ADDED SALT

Daily level of added salt consumption.—Normal consumption of salt ranges from 7.5 to 18 grams (Guthrie, 1979) per day.¹⁶ There has been much discussion recently over American's salt consumption. The American diet provides much more sodium than the body needs. The question is whether this overage is harmful. In reaction to this debate, the American Health Foundation (1972) recommended a limit of 5 grams of salt per day, adjusted for climate. Page (AMA, 1977) lends support to this standard.

Daily added salt usage was computed on the basis of the answers by mail survey respondents to the following question:

How many times do you usually use salt each meal? (Write in number of shakes below, if none, write in "0".)

Meals:	Number of shakes (Write in)
Breakfast	_____
Lunch	_____
Dinner	_____

Daily added salt intake was the sum of the shakes used for breakfast, lunch, and dinner. Table 11 reports added salt usage by meal.

¹⁶This is a conservative estimate of added salt usage. It does not include added salt intake resulting from snacks.

TABLE 11.—*Daily added salt consumption (by percentage)*

Shakes added/meal:	Breakfast	Lunch	Dinner
0	60.6	56.8	28.4
1 to 3	25.3	30.3	19.8
4 and over	14.1	12.9	51.8

The total mean daily added salt intake was 3.2 shakes. Mean daily added salt consumption for breakfast, lunch, and dinner was 0.66, 0.79, and 1.82 shakes, respectively. The range of added salt intake for each meal was: 0-11 shakes for breakfast, 0-10 shakes for lunch, and 0-20 shakes for dinner. The total mean daily added salt intake for just those respondents who reported added salt usage was 6.4 shakes.¹⁷

When converted into grams, the total mean daily added salt intake was 1.6 grams, or more than 30 percent of the American Health Foundation's recommended salt allowance. (Each shake of the salt shaker is valued at 0.5 grams.) The total mean daily salt intake for the respondents who actually added salt to their food constituted more than 60 percent of the American Health Foundation's standard. Added salt practices therefore have a major impact on overall salt consumption.

Preliminary demographic segmentation of added salt users.—When the respondents were segmented according to age, sex, and geographic region, there were significant differences between the mean daily added salt usage reported by the resulting population segments. Tables 12-14 present these findings. The problem population segments included consumers under 25 years of age and men as well as residents of the South Atlantic and Mountain States. No statistically significant differences were reported when respondents were segmented by race and family income.

TABLE 12.—*Added salt users segmented by age*

Age in years:	Mean daily consumption of added salt (in shakes)
Less than 25	4.1
25 to 34	3.7
35 to 44	3.0
45 to 54	2.8
55 to 64	2.5
65 and over	2.1

TABLE 13.—*Added salt users segmented by sex*

Sex:	Mean daily consumption of added salt (in shakes)
Male	3.6
Female	2.7

¹⁷ When computing this mean, those respondents who did not add salt at the table were dropped from the calculation.

TABLE 14.—*Added salt users segmented by geographic region*

Regions:	Mean daily consumption of added salt (in shakes)
New England	2.9
Middle Atlantic	2.9
East North Central	3.1
West North Central	3.1
South Atlantic	3.9
East South Central	2.8
West South Central	2.4
Mountain	4.0
Pacific	2.4

Preliminary eating habit segmentation of added salt users.—When the respondents were segmented according to general eating out patterns, fast food patronage, vending machine utilization, traditional restaurant patronage, and snacking practices, there were significant differences between the mean daily added salt usage reported by the resulting population segments. Tables 15-19 present these findings. The problem population segments included those consumers who eat away from home as well as those who patronize fast food restaurants, vending machines, and traditional restaurants four or more times per week. Those who snack three or more times per day also reported high added salt usage.

TABLE 15.—*Added salt users segmented by general eating out patterns*

Number times per week eat away from home:	Mean daily consumption of added salt (in shakes)
0 to 1	2.8
2 to 3	3.2
4 and over	3.8

TABLE 16.—*Added salt usage segmented by fast food patronage*

Number times per week patronize:	Mean daily consumption of added salt (in shakes)
0 to 1	2.9
2 to 3	3.9
4 and over	5.2

TABLE 17.—*Added salt usage segmented by vending machine utilization*

Number times per week patronize:	Mean daily consumption of added salt (in shakes)
0 to 1	3.1
2 to 3	3.8
4 and over	5.5

TABLE 18.—*Added salt usage segmented by traditional restaurant patronage*

Number of times per week patronize:	Mean daily consumption of added salt (in shakes)
0 to 1	3.1
2 to 3	2.9
4 and over	5.3

TABLE 19.—*Added salt usage segmented by snacking practices*

Number of times per day:	Mean daily consumption of added salt (in shakes)
0	2.4
1 to 2	3.1
3 to 4	4.2
5 and over	4.2

Relationship between nutrition knowledge and consumption of added salt.—Table 20 describes the relationship between the nutrition IQ index and the consumption of added salt. The highest IQ scores were associated with the lowest daily added salt usage. This relationship supports the case for nutrition education.

TABLE 20.—*Relationship between nutrition IQ and consumption of added salt*

Nutrition IQ:	Mean daily consumption of added salt (in shakes)
Low	4.0
Medium	3.0
High	2.4

CONCLUSIONS

Daily levels of added sugar and salt consumption.—Added salt accounted for a substantial (more than 30 percent) portion of the recommended salt allowance. Added sugar constituted less than 10 percent of the suggested level for sugar intake. In each case, however, Americans consume substantially more than the recommended levels of sugar and salt. Therefore, added sugar and salt practices aggravated the general problem of overconsumption.

These findings bear special significance to nutrition policymakers concerned with decreasing overall sugar and salt consumption. This is because table usage practices are among those few areas where the consumer can easily control sugar and salt consumption.

Population segmentation.—For nutrition education to be effective it must be directed toward the right audiences and must be tailored to those audiences' special needs. Population segmentation techniques provide the raw data for such targeting and tailoring.

The population segmentation techniques employed in this paper were quite crude. They were purposely left simple so as to best illustrate the process of population segmentation. More sophisticated variants of this technique include: Segmenting by more characteristics (including disease-related and psychographic factors), controlling for selected segmentation characteristics (for example, black men or elderly women), and conducting multiple regression of stepwise regression analysis.¹⁸

Relationship between nutrition knowledge and consumption of added sugar and salt.—The data indicated an association between those scoring highest on the nutrition IQ and those consuming the lowest levels of added sugar and salt. This association suggests that properly designed nutrition education programs can be used to promote decreased sugar and salt consumption.

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¹⁸ Such regression analysis would identify the relative importance of the segmentation characteristics in explaining added sugar and salt practices.

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NUTRIENTS FROM MEALS AND SNACKS

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The Nationwide Food Consumption Survey (NFCS) 1977-78 is the most recent of the six nationwide household food consumption surveys conducted by the U.S. Department of Agriculture (USDA) and the second survey in which data were collected on the food intakes of individual members of households as well as food used at home by entire households. We now report the nutrient content of meals and snacks consumed by individuals in the 48 conterminous States in the spring of 1977. Individuals are from a stratified area probability sample of households surveyed.

Data describing the nutrient content of meals and snacks are important because people usually eat combinations of foods rather than a single food for a meal. Along with changes in life styles, introduction of many new foods into the marketplace and the increase in eating away from home, meal and snack patterns may also be changing. The effects of such changes need to be delineated. Therefore, the percentage of the day's nutrient intake provided by the meal or snack and the nutrient density (nutritive value per 1,000 kcal) are used to describe meals and snacks reported. Nutrient density is one measure of nutrient quality of assortments of foods selected.

DATA COLLECTION AND PROCESSING

Trained interviewers first obtained information on kinds, amounts, and money value of food used in the household as well as on characteristics of the household such as income, composition, race of respondent, education, and occupation of male and female heads. After completing questions concerning the household, the interviewer asked each individual member present to recall the kinds and amounts of all foods and beverages ingested during the previous day. Members were then given instructions for keeping a diary of food and beverage intake for the day of and the day following the interview. Later, the interviewer returned to collect and review the diaries. Mothers or other responsible persons provided information for children under 12 years of age. The respondent reported the kind and amount of each food and beverage ingested both at home and away from home with the name of the eating occasion and the time the eating occasion began.

The energy and nutrient values of foods eaten on each occasion were calculated from composition data in Agriculture Handbook No. 8, including recently revised sections, and from data supplied by manufacturers. Values not available from these sources were estimated from values of ingredients or of similar foods.

The data presented in this paper are for the 1-day dietary recalls of 9,620 individuals, classified in 22 sex-age groups. Counts of individuals are weighted to adjust for households selected to be surveyed but from whom responses were not obtained. (The unweighted count of individuals is 8,626.) Breast-fed infants are excluded.

Eating occasions—as named by the respondents—are classified as breakfast, lunch (includes brunch), dinner, supper, and snacks. Snacks include occasions identified as snacks and coffee or beverage breaks, as well as those designated as “other” or “not reported.” The nutritive values presented for a specified meal are based on food consumed at the meal by only those individuals who reported eating that meal. Values for snacks are based on food consumed at snacks by only those individuals who reported one or more snacking occasions during the day surveyed. Therefore, the number of individuals differs for breakfast (8,291), lunch (7,409), dinner (4,703), supper (5,040), and snacks (5,859). Of individuals surveyed, 86 percent reported breakfast, 77 percent lunch, 49 percent dinner, 52 percent supper, and 61 percent snacks.

BREAKFAST

While 86 percent of the participants had breakfast on the day surveyed, percentages for various sex-age groups differed. Almost all (over 95 percent) of the children, and adults 65 years and over, ate breakfast. Groups with the smallest fraction reporting breakfast were girls 15 to 18 years (77 percent), the 19- to 22-year-olds (71 percent), and adults 23 to 34 years (75 to 77 percent).

Percentage of day's nutrients

Energy.—Breakfast provides about one-fifth of the day's food energy for breakfast eaters (table 1). Groups most often having breakfast—children and adults over 65 years—also got the most energy from breakfast (23 to 27 percent of the day's energy). People 23 to 64 years averaged the least (18 to 20 percent). Breakfasts generally provided a smaller part of the day's protein and fat (18 percent) and more carbohydrate (26 percent) than energy (21 percent). As for food energy, children and the elderly generally got above average proportions of their protein, fat, and carbohydrate from breakfast, while middle-age adults got smallest proportions.

Minerals.—Breakfast provided a larger proportion of the day's minerals (23 to 30 percent) than of the day's food energy (21 percent). Nearly one-third (30 percent) of the day's calcium, about one-fourth of the iron (25 percent) and magnesium (27 percent) and slightly less than one-fourth of the phosphorus (23 percent) came from breakfast. Calcium from breakfast averaged higher (29 to 35 percent) for groups under 23 years and over 64 years of age than for adults 23 to 64 years (26 to 29 percent). Iron from breakfast was highest by far for infants, averaging 44 percent of the day's supply. Probably iron-fortified infant cereal contributed substantially to this high contribution of iron at breakfast. Children under 12 years, boys 12 to 14 years, and the elderly received one-third of their iron intake from breakfast and adults 35 to 50 years received the lowest fraction—one-fifth of the day's amount. Magnesium from breakfast was highest for adults over 64 years—about one-third of the day's intake. A number of these older

adults had breakfast containing several cups of coffee, which provides moderate amounts of magnesium. Phosphorus from breakfast tended to be highest for children under 9 and for adults over 74 years (25 to 29 percent) and lowest for adults 23 to 64 years (19 to 23 percent).

Vitamins.—Breakfast provided a higher percentage of the day's vitamins than of the day's food energy. Close to one-third of the vitamin A value (28 percent), thiamin (31 percent), riboflavin (30 percent), and vitamin C (31 percent) came from this meal, but less of the preformed niacin (23 percent), vitamin B₆ (22 percent), and vitamin B₁₂ (26 percent). The proportion of the day's vitamin intake was higher for children under 12 years than for other sex-age groups. Children's breakfasts provided well over one-third of the day's intake of all vitamins except preformed niacin and vitamin B₆. Breakfasts of adults 23 to 64 years provided the smallest percentage—usually from one-fifth to one-fourth of their day's intake. Groups of men and women differed little in the proportion of the day's vitamins from breakfast except for vitamin C. Women 35 years and over tended to average a larger proportion of their vitamin C from breakfast than did men of the same age.

Nutrient density

Energy.—Protein density of breakfast averaged slightly higher for children, teenagers, and men (32 to 35 g/1,000 kcal) than for women (30 to 32 g/1,000 kcal). Fat density tended to be higher for men than for other groups. Carbohydrate density of breakfast was higher for women than for men, averaging highest for girls 9 to 11 years and elderly women (149 to 150 g/1,000 kcal) and lowest for young and middle-aged men (123 to 130 g/1,000 kcal).

Minerals.—Calcium density averaged highest by far in breakfast of infants (over 1,100 mg/1,000 kcal) because of the high intake of milk. Calcium density of breakfast eaters tended to decrease as age increased. After infants, the progression went from 774 mg/1,000 kcal for 1- to 2-year-olds to 446 mg/1,000 kcal for men over 74 years and 528 mg/1,000 kcal for women of the same age. For the most part, average calcium density of breakfast was higher for women than for men of similar age. Iron density of infants' breakfast was very high (43 mg/1,000 kcal). Children 1 to 2 years and adults 23 to 74 years had iron densities of 11 to 14 mg/1,000 kcal and teenagers and adults 75 years and over had values of 8 to 10 mg/1,000 kcal. Magnesium densities of breakfasts of adults 19 to 74 years of age were very high (333 to 830 mg/1,000 kcal). Coffee, which provides some magnesium but essentially no energy, has an excessively high magnesium per 1,000 kcal value. Breakfasts of coffee alone contributed to these high values. Magnesium densities of breakfasts of children under 15 years were much lower (145 to 185 mg/1,000 kcal). Phosphorus density of breakfast tended to be highest for adults 23 to 50 years (826 to 919 mg/1,000 kcal) and lowest for adults 75 years and over (695 to 703 mg/1,000 kcal).

Vitamins.—Average vitamin densities of breakfast varied by sex-age group but tended to be highest for infants and children, less for teenagers and the elderly, and lowest for young and middle-aged adults. However, the density of preformed niacin was somewhat the reverse—highest for adults 23 to 64 years and lowest for groups 1 to

22 years and over 74 years. The density of vitamin A value was lowest for infants but was highest for 3- to 11-year-olds. Vitamin C density averaged higher for females than for males of the same age.

LUNCH

Of all participants, 77 percent reported lunch. Of children 3 to 11 years, around 85 percent had lunch, but fewer teenagers and adults reported lunch, with the smallest proportion among the elderly (64 to 73 percent). Some of the individuals undoubtedly called their mid-day meal dinner.

Percentage of day's nutrients

Energy.—Lunch provided about one-third of the day's energy and the three energy-yielding nutrients (31 to 34 percent) for lunch eaters (table 2). Infants, with their frequent feedings, and young children were the exceptions; those reporting lunch received one-fourth of their caloric intake at lunch and 1- to 2-year-olds received only slightly more (28 percent). The 19- to 22-year-olds averaged the highest proportion of the energy from lunch (35 to 36 percent); their lack of breakfast may have been a factor.

Minerals.—Almost one-third of the day's calcium, iron, magnesium, and phosphorous came from lunch for those reporting this meal. Infants and 1- to 2-year-olds for whom lunch was only one of several feedings, again averaged least (16 to 25 percent) and 19- to 22-year-olds averaged most (31 to 36 percent).

Vitamins.—Generally, lunch provided one-fourth of the vitamin C, slightly more than one-fourth of the vitamin A value (28 percent) and vitamin B₆ (29 percent), and nearly one-third of the thiamin, riboflavin, preformed niacin, and vitamin B₁₂ (31 to 33 percent). Infants' lunches provided the least of all these vitamins except for vitamin A value. Young children also averaged smaller proportions of vitamins from lunch than older people.

Nutrient density

Energy.—Protein and fat density of lunch tended to average higher for adults than for children or teenagers. Protein density among adults averaged higher for women than for men with a peak for women at 51 to 64 years (46 g/1,000 kcal). Fat density of men's lunches averaged the highest for elderly men but the average fat density of women's lunches was the same for all age groups of women. Carbohydrate density of lunches was higher for children than for teenagers or adults and highest for infants.

Minerals.—Generally, density of the four minerals—calcium, iron, magnesium, and phosphorus—averaged highest in lunches of infants. Mineral densities of women's lunches were equal to or higher than those for men's lunches. Adults usually had greater density of iron and magnesium in lunches than children, but children's lunches usually had greater density of calcium.

Vitamins.—Density of four vitamins—vitamin A value, riboflavin, vitamin B₆, and vitamin C—was greatest in lunches of infants, and of one vitamin—preformed niacin—was lowest. Women's lunches tended to have a higher average density of vitamin A value, riboflavin, vitamin B₆, and vitamin C than men's lunches. For several vitamins—

vitamin A value, thiamin, riboflavin, and vitamin C—density was higher in lunches of older adults than in lunches of younger adults. Vitamin B₆ and vitamin B₁₂ densities of lunch were often lower for children 3 to 12 years than for older groups.

DINNER

Nearly one-half of the survey participants reported having dinner. More of the older adults (over 50 years) than children reported dinner and only one-third of the infants had dinner. Dinner may be either a midday or evening meal, since time of eating was not a criterion in the definition of meals in this paper.

Percentage of day's nutrients

Energy.—Dinner provided 45 percent of the day's food energy of dinner eaters (table 3). Middle-aged men and young and middle-aged women averaged about one-half of the day's energy from dinner; other adult and teenage groups and children averaged less (31 to 37 percent); and infants averaged the least (24 percent). Protein and fat from dinner averaged about one-half of the day's intake but carbohydrate from dinner was considerably less—38 percent. The average proportion of the day's protein and fat from dinner generally increased with age until 51 to 64 years for men and 35 to 50 years for women and then declined. Carbohydrate from dinner also generally increased with increase in age from about one-fourth of the day's supply for the youngest children to around two-fifths for adults.

Minerals.—Dinner provided nearly one-half (46 percent) of the day's iron, between one-half and two-fifths (44 percent) of the phosphorus, two-fifths (41 percent) of the magnesium, and somewhat over one-third (36 percent) of the calcium. Infants got the lowest proportion of the day's mineral supply from dinner—about one-fifth of iron and one-fourth each of the other minerals. Children under 12 years received about one-fourth to one-third of their calcium from dinner and about one-third to two-fifths of the other three minerals. Generally, teenage girls and young and middle-aged adults depended on dinner to provide a major portion of the day's minerals. About one-half of their iron and phosphorus, well over two-fifths of their magnesium, and nearly two-fifths of their calcium came from dinner. Dinner provided a lower proportion of the day's intake of minerals for the elderly than for younger adults.

Vitamins.—Dinner supplied dinner eaters with about one-half of the day's intake of three vitamins—vitamin A value, preformed niacin, and vitamin B₆, and approximately two-fifths of the day's intake of the other four vitamins—thiamin, riboflavin, vitamin B₁₂, and vitamin C. Infants got the least of their day's intake of all these vitamins except vitamin A value from dinner (one-fifth to one-fourth). Generally, the average proportion of the day's vitamins from dinner was higher for adults than for children and the elderly. Infants and three out of four groups of children obtained one-third of the day's vitamin A value from dinner; several teenage groups and elderly men got about two-fifths; and other adult groups got about one-half or more. The pattern for thiamin and riboflavin from dinner was similar—about one-fourth to one-third of the day's supply for children under 14 years, about two-fifths during late teenage, and well over two-fifths during

adulthood, with a decline after 65 years. Females generally obtained more of their performed niacin and vitamin B₆ from dinner than did males.

Nutrient density

Energy.—Protein and fat densities of dinner were lowest for infants and highest for men 51 to 64 years and women 35 to 64 years. Carbohydrate density averaged highest for dinner of infants (133 g/1,000 kcal) and progressively decreased with increase in age until reaching a low for 35- to 64-year-old adults (81 to 84 g/1,000 kcal).

Minerals.—Mineral densities of dinner generally averaged highest for infants. Calcium and phosphorus densities of dinners usually averaged higher for children than for older groups. Iron and magnesium densities were usually lowest for children and teenagers and highest for adults 35 years and over. Women tended to average higher iron and magnesium densities in their dinners than men of the same age. The density of phosphorus (629 mg/1,000 kcal) was almost double that of calcium (328 mg/1,000 kcal).

Vitamins.—Densities of three vitamins—vitamin A value, riboflavin, and vitamin C—averaged highest in dinner of infants but density for one—preformed niacin—was lowest. Women's dinners usually had higher average densities of vitamin A value, thiamin, and vitamin C than those of men. Adults over 50 years tended to have dinners with higher average density values for vitamin A value, preformed niacin, vitamin B₆, vitamin B₁₂, and vitamin C than younger groups.

SUPPER

Over one-half (52 percent) of the individuals surveyed reported supper. The percentage varied from the highest for infants and children under 6 years (61 to 65 percent) to lowest for women 19 to 22 years (46 percent).

Percentage of day's nutrients

Energy.—Supper provided 42 percent of the day's energy for supper eaters, slightly less than dinner eaters obtained from dinner (45 percent) (table 4). Young and middle-aged adults and teenage girls averaged the highest percentage of the day's energy from supper (44 to 47 percent) and children under 12 years (33 to 36 percent) and infants (22 percent) the least. Slightly less than one-half of the day's protein (47 percent), over two-fifths of the fat (44 percent), and over one-third of the carbohydrate (36 percent) came from supper.

Minerals.—About one-third of the calcium and around two-fifths of the magnesium, phosphorus, and iron came from supper for persons reporting that meal. The proportion of the day's minerals from supper was lowest for infants (about one-fifth). Generally, the proportion was highest for young adults (almost one-half the iron, phosphorus and magnesium, and two-fifths of the calcium). With increase in age the proportions of minerals gradually diminished to just over one-third for the adults 75 years and over.

Vitamins.—Supper averaged, for those reporting this meal, about two-fifths of the vitamin A value, thiamin, riboflavin, vitamin B₁₂, and vitamin C; over two-fifths of the preformed niacin; and almost

one-half of the vitamin B₆. Infants received the smallest proportion of their day's vitamins from supper (about one-fifth to one-fourth) and 1- to 2-year-olds averaged only slightly more of four vitamins—vitamin A value, thiamin, riboflavin, and vitamin B₁₂. Young adults generally acquired a larger proportion of these vitamins from supper than did any other sex-age group—an average of nearly one-half of the day's intake.

Nutrient density

Energy.—Protein and fat densities of supper were lowest and carbohydrate density the highest for infants and women 75 years and over. Generally, protein and fat densities of supper averaged less for children than for adults other than the elderly. Carbohydrate densities were generally higher for women than for men of the same age.

Minerals.—Infants, children, and elderly women had the highest calcium and phosphorus densities in supper. Iron densities of supper were highest for infants—19 mg/1,000 kcal—and for children were 6.6 to 7.0 mg/1,000 kcal and for adults were 7.0 to 7.9 mg/1,000 kcal. Magnesium densities were higher for men over 50 years and for women over 35 years than for younger groups.

Vitamins.—Infants had the highest densities in supper for thiamin, riboflavin, and vitamin C. Density of vitamin A value in supper averaged higher for adults over 50 years than for younger groups. Thiamin and riboflavin densities of supper averaged higher for children than for teenagers and young adults. Adults tended to have higher densities than children and teenagers for preformed niacin, vitamin B₆, vitamin B₁₂, and vitamin C. Density of vitamin C and vitamin A value in supper generally averaged higher for women than for men except in the oldest group.

SNACKS

Of the individuals surveyed, 61 percent had at least one snack (all occasions not designated as one of the four meals just discussed). Relatively more children and teenagers (59 to 70 percent) than adults (55 to 64 percent) snacked. In the infant group 86 percent were categorized as snacking, but this large compilation is due to the frequency of eating occasions reported as feedings. Thus, snacks may be a misnomer for many of these eating occasions. Of the persons reporting snacks, 53 percent had only one snack, 28 percent had two, 11 percent had three, and 8 percent had four or more.

Percentage of day's nutrients

Energy.—Snacks provided approximately 20 percent of the day's food energy for those reporting at least one snack (table 5). Adults over 34 years averaged slightly less (14 to 18 percent). Snack occasions provided infants with at least a third of their day's intake of food energy (and all nutrients except for iron and niacin). Protein from snacks accounted for 12 percent and fat for 16 percent of the day's intake for snackers. The 1- to 2-year-olds received 18 percent of their day's protein from snacks. Adults averaged slightly less of the day's fat from snacks (12 to 15 percent) than teenagers and the youngest children (18 to 21 percent). Carbohydrate intake from snacks averaged 25 percent of the day's intake.

Minerals.—The day's mineral intakes of individuals averaged from 14 percent for iron and 18 percent for phosphorus to 21 percent for magnesium and calcium. Calcium and magnesium from snacks of 1- to 2-year-olds provided 29 to 25 percent, respectively, of the day's intake. Snacks provided a smaller proportion of the day's iron than of the other three minerals for all age groups.

Vitamins.—Snacks provided, for snackers, 13 to 14 percent of the day's intake of vitamin A value, thiamin, preformed niacin, vitamin B₆, and vitamin B₁₂, and 16 to 17 percent of the vitamin C and riboflavin. Generally, snacks of 1- to 2-year-olds averaged the highest proportion of the day's vitamins except niacin. Only for vitamin A value and vitamin B₆ did any group receive a larger share of its day's intake from snacks than the 1- to 2-year-olds. Older teenage girls averaged the highest proportion of the day's vitamin A value and young men (19 to 22 years) the highest proportion of the day's vitamin B₆ from snacks. Snacks of 12- to 22-year-olds generally provided close to the same proportion of the day's vitamins as snacks of 1- to 2-year-olds (17 to 25 percent). Elderly men generally received the lowest proportion of the day's vitamins from snacks. Niacin in snacks did not follow the pattern observed for the other vitamins. The proportion of niacin from snacks was greater for teenagers and young and middle-aged adults (13 to 18 percent) than for children and the elderly (except for women over 74 years) (9 to 12 percent).

Nutrient density

Energy.—Protein density of snacks averaged 21 g/1,000 kcal. Generally, protein densities decreased with age from infancy to the teenage years and then increased with increase in age during the adult years. Highest protein densities were reported for snacks of infants, 1- to 2-year-olds, and adults over 74 years. Fat and carbohydrate densities of snacks averaged 29 and 149 g/1,000 kcal, respectively. Snacks of infants, 1- to 2-year-olds, and 12- to 14-year-olds had the highest fat densities (34 to 38 g/1,000 kcal). Carbohydrate densities of snacks were highest for 3- to 11-year-olds (just over 165 g/1,000 kcal) and progressively declined with increase in age until reaching lows at 51 to 64 years.

Minerals.—Mineral densities of snacks were generally higher for infants, 1- to 2-year-olds (except for iron), and adults. Calcium densities of snacks were especially high for infants and 1- to 2-year-olds. Iron densities of snacks were highest for infants and adults over 22 years. Magnesium densities of adults' snacks were two to six times as large as those of younger groups, evidence of the coffee breaks.

Vitamins.—Generally, vitamin densities of snacks averaged highest in snacks of infants and the elderly and lowest in snacks of young- and middle-aged adults. Densities of vitamin A value were also high in snacks of 9- to 11-year-olds and most groups of women. Snacks of females had higher average vitamin C densities than snacks of males. Density of preformed niacin in snacks averaged much lower for children than for adults.

SUMMARY AND CONCLUSIONS

The percentage of energy and nutrients obtained from meals and snacks varied by sex-age groups but some general patterns seem to be evident when average values for persons reporting each eating occasion are considered. The data are descriptive and have not been tested for significance. At breakfast adults 23 to 64 years tended to obtain around one-fifth of the day's energy, protein, and fat, and infants, children, and the elderly obtained closer to one-fourth of their day's intake. Generally, infants, children, and elderly adults obtained a higher proportion of the day's carbohydrate, minerals, and vitamins than adults 23 to 64 years, especially the 35- to 50-year-olds. At lunch about one-third of the day's energy and nutrients were obtained by most age groups, but infants, 1- to 2-year-olds obtained closer to one-fourth of their intakes from this meal. At dinner and supper adults under 65 years obtained between two-fifths and one-half of energy and most nutrients. Children and the elderly obtained closer to one-third to two-fifths, and infants closer to one-fifth to one-fourth. Occasions classified as snacks provided 20 percent of the day's energy but 25 percent of the carbohydrate, 16 percent of the fat, and 12 percent of the protein. About 15 percent of the day's vitamins (13 to 17 percent) and iron (14 percent) but about 20 percent of the other three minerals (18 to 21 percent) came from snacks.

Nutrient density (nutrient per 1,000 kcal) of meals and snacks indicates relationships that are useful in evaluating quality of diets. Some patterns of interest emerge when average values for sex-age groups are compared although not yet tested for significance. For breakfasts protein densities averaged lower for women than for other groups. Men's breakfasts had the highest average fat densities but the lowest carbohydrate densities. Densities of calcium and iron, as well as most vitamins discussed, averaged highest for infants and young children. Vitamin densities tended to be lowest for adults 23 to 64 years. For lunch protein densities averaged higher for adults and lower for children and teenagers but carbohydrate densities were highest for infants and children and lowest for adults. Men over 64 years had lunches with the highest average fat densities. Densities of minerals and most vitamins considered averaged highest for infants. While calcium density was highest in children's lunches, iron and magnesium were highest in lunches of adults. Vitamin densities in lunches tended to be lower for children than for adults.

For dinner and supper protein and fat densities averaged highest for middle-aged adults and lowest for infants and children but carbohydrates densities were highest for infants and children and lowest for adults. Generally, calcium and phosphorus densities were higher for children than for adults but iron and magnesium densities were higher for adults than for children. Other than for thiamin and riboflavin, vitamin densities tended to average higher for adults over 50 years than for younger groups. For snacks, protein densities averaged highest for infants, 1- to 2-year-olds, 9- to 14-year-old boys, and the

elderly. Infants, 1- to 2-year-olds, and teenagers had snacks with the highest average fat densities while 3- to 11-year-olds had snacks with the highest carbohydrate densities. Except for calcium, mineral densities averaged higher for adults than for children over 2 years, and other than niacin, vitamin densities tended to be higher for infants and elderly and lower for young and middle-aged adults.

In conclusion, the average proportion of the day's nutrients from each of the day's meals varied from meal to meal and among sex-age groups. Energy and nutrient intakes of children and the elderly appeared to be more evenly spread among their meals but young and middle-aged adults tended to derive less of the day's intake from breakfast than other groups and about half of most nutrients from the dinner or supper meal. Intakes of teenage girls were generally similar to those of young women. Nutrient contributions of snacks to the day's intake differed from contributions of meals. Snacks, on the average, were the source of more of the day's carbohydrate than of other nutrients. Young children obtained a larger proportion of their day's energy and nutrients from snacks than did other groups. Nutrient densities of the various eating occasions also varied but such differences need further study.

TABLE 1.—NUTRITIVE VALUE OF BREAKFAST
Percentage of a day's¹ intake per individual reporting breakfast, spring 1977, 48 States, all urbanizations, all incomes²

Sex and age (years)	Individuals (number)	Individuals reporting breakfast	Food energy	Protein	Carbo-hydrate	Iron	Magnesium	Phosphorus	Vitamin A value	Thiamin	Riboflavin	Pre-formed niacin	Vitamin B ₆	Vitamin B ₁₂	Vitamin C
Males and females:															
Under 1	278	89.6	23.2	21.3	20.3	25.7	44.2	26.7	15.8	39.7	32.5	38.7	24.8	20.6	25.6
1 to 2	264	98.8	24.2	23.3	34.4	35.4	35.1	29.7	29.3	41.0	37.6	31.2	32.5	32.1	37.5
3 to 5	437	95.8	24.4	22.6	21.5	27.4	35.3	28.8	28.8	38.4	37.1	37.9	32.6	34.6	36.3
6 to 8	469	96.5	23.2	21.0	19.6	27.4	33.6	29.2	26.8	27.2	37.8	36.7	37.5	31.9	33.3
Males:															
9 to 11	216	92.5	21.9	19.6	18.7	26.0	33.8	27.6	25.0	26.3	38.6	37.0	37.9	31.6	32.8
12 to 14	313	92.2	22.5	19.4	19.1	26.9	33.4	27.0	24.9	25.6	33.7	34.6	34.7	26.0	30.8
15 to 18	400	86.1	20.4	18.4	18.0	24.1	29.4	24.8	24.2	23.8	32.1	31.4	23.7	28.1	32.9
19 to 22	287	70.6	22.4	20.9	21.8	25.8	35.4	24.1	26.5	26.2	31.0	31.6	33.1	20.1	28.1
23 to 34	770	74.6	19.9	18.9	18.3	23.2	28.8	22.5	24.2	22.5	28.2	28.2	27.8	19.4	28.6
35 to 50	784	84.0	17.3	15.4	16.3	22.0	25.6	21.0	23.3	19.0	22.2	25.2	24.0	17.5	15.4
51 to 64	634	91.4	19.4	19.7	16.5	17.8	23.9	26.0	23.2	25.9	20.6	23.6	27.0	20.7	22.5
65 to 74	295	94.9	20.1	20.5	20.5	30.0	29.7	29.7	25.7	25.7	27.7	35.3	31.3	18.3	22.5
75 and over	127	98.3	26.9	22.5	23.7	32.2	31.3	30.6	33.2	27.9	27.2	35.1	32.8	26.2	25.0
Females:															
9 to 11	241	95.4	21.7	18.9	17.8	26.2	33.1	26.4	25.4	25.2	36.0	36.1	24.7	29.5	37.9
12 to 14	309	85.6	21.3	20.0	19.0	24.9	33.0	23.8	24.1	24.8	33.7	31.6	33.5	21.8	30.5
15 to 18	402	76.8	21.4	18.8	18.5	25.3	31.0	23.8	25.1	24.3	29.7	32.4	31.9	22.1	23.7
19 to 22	337	71.1	22.8	20.3	19.9	28.2	32.8	24.2	29.1	26.4	31.8	31.1	22.8	22.1	31.2
23 to 34	949	75.9	16.3	16.2	16.2	23.5	25.9	21.8	25.1	20.4	26.4	26.4	20.1	18.4	34.2
35 to 50	942	85.4	18.5	14.9	15.2	24.3	26.5	21.3	27.1	19.7	26.5	24.6	19.9	16.7	27.7
51 to 64	792	90.2	19.6	15.7	15.8	26.4	26.9	23.0	28.5	21.0	22.1	28.3	25.2	21.5	26.8
65 to 74	377	96.4	22.8	19.0	18.3	29.0	23.2	27.4	24.5	25.3	32.8	28.4	25.2	17.9	21.1
75 and over	197	97.6	25.2	20.5	20.5	31.6	30.8	29.9	33.0	25.9	35.4	30.0	27.1	24.6	32.5
All individuals	49,620	86.2	21.1	18.3	18.2	25.8	29.6	25.1	26.7	23.3	27.8	30.9	29.7	22.3	25.9

¹ Based on 24-hr dietary recall of day preceding interview.

² Excludes 36 breast-fed infants.

³ Excludes 4 breast-fed infants.

⁴ Excludes 40 breast-fed infants.

Data source: USDA nationwide food consumption survey, 1977-78, 48 conterminous States, spring 1977, preliminary Rpt. No. 2, September 1980, p. 102.

TABLE 2.—NUTRITIVE VALUE OF LUNCH
[Percentage of a day's¹ intake per individual reporting lunch, spring 1977, 48 States, all urbanizations, all incomes]

Sex and age (years)	Individuals (number)	Individuals reporting lunch	Food energy	Protein	Fat	Carbohydrate	Calcium	Iron	Magnesium	Phosphorus	Vitamin A value	Thiamin	Riboflavin	Pre-formed niacin	Vitamin B ₆	Vitamin B ₁₂	Vitamin C
Males and females:																	
Under 1	278	78.5	24.1	25.3	25.0	23.3	20.4	16.4	21.3	25.3	24.6	16.1	19.1	20.3	25.1	21.9	
1 to 2	3264	81.8	27.7	28.0	29.3	25.9	24.0	24.9	23.9	28.8	21.8	21.3	21.7	24.4	17.4	20.5	
3 to 5	437	85.3	30.9	31.2	31.9	30.1	29.1	28.4	28.9	29.0	22.6	27.9	25.9	23.5	27.3	22.4	
6 to 8	469	87.3	32.8	33.7	34.3	31.5	33.1	30.1	31.8	32.4	25.4	28.6	28.6	31.9	26.6	29.9	
Males:																	
9 to 11	216	85.0	33.3	34.3	34.9	31.9	33.3	30.7	32.3	32.2	27.4	28.6	28.7	31.4	27.5	30.1	29.8
12 to 14	313	79.5	31.4	31.6	31.6	31.8	27.7	29.7	30.3	30.3	25.1	28.2	28.7	25.8	30.1	26.8	
15 to 18	400	76.8	32.1	33.3	34.0	30.6	32.6	30.6	29.8	31.7	25.6	29.8	30.3	31.3	28.3	34.4	22.6
19 to 22	287	74.6	35.8	36.5	37.2	35.1	36.4	35.4	32.0	34.9	28.6	36.1	34.9	34.4	35.2	35.8	25.9
23 to 34	770	75.7	34.7	34.7	34.4	32.3	34.3	34.3	34.3	32.1	27.5	33.3	30.9	34.0	30.7	33.3	24.5
35 to 50	784	77.4	32.7	33.7	34.3	32.8	33.4	32.3	28.7	32.3	27.9	33.7	32.3	32.2	30.5	34.6	27.3
51 to 64	634	74.3	31.7	31.6	32.3	32.2	29.8	27.0	30.4	26.1	26.1	29.5	31.5	29.9	32.2	25.6	23.8
65 to 74	295	72.9	32.2	33.0	34.4	29.9	32.6	29.9	27.9	31.5	29.9	29.8	30.8	29.0	31.2	23.8	
75 and over	127	64.1	31.9	33.4	34.6	28.9	33.4	29.3	26.7	32.3	31.4	27.9	29.6	30.3	28.3	34.0	25.7
Females:																	
9 to 11	241	82.7	32.2	33.7	34.3	30.3	33.7	29.4	31.2	32.1	24.0	27.8	28.9	31.7	26.0	31.8	20.9
12 to 14	309	81.6	32.9	34.0	33.0	33.7	32.3	33.0	31.9	33.0	26.6	31.4	32.4	28.9	33.4	26.9	
15 to 18	402	76.0	31.3	31.8	32.7	30.4	31.2	31.1	29.5	31.1	26.7	30.4	30.1	30.3	28.4	33.3	27.1
19 to 22	337	74.8	35.2	36.2	37.6	33.5	35.2	34.3	30.7	34.5	29.9	33.8	33.7	33.5	31.9	37.2	28.7
23 to 34	949	76.7	33.1	35.1	35.5	31.5	35.7	32.5	29.0	33.8	30.6	33.7	32.5	31.7	30.5	36.1	26.3
35 to 50	942	76.4	32.6	34.0	34.4	31.4	33.8	31.7	28.1	32.7	29.4	32.3	32.6	31.5	30.8	35.7	24.4
51 to 64	792	74.5	31.0	33.3	32.3	30.2	32.1	31.4	26.7	31.4	28.2	30.2	30.6	30.3	29.8	33.4	25.0
65 to 74	377	70.3	33.5	35.1	36.3	30.6	32.5	31.5	28.9	32.6	30.7	30.1	31.1	32.3	30.9	31.6	25.7
75 and over	197	65.0	34.0	37.5	37.1	30.2	33.2	30.7	29.4	34.7	31.2	29.8	31.0	32.0	34.3	34.4	28.8
All individuals	49,620	77.0	32.3	33.5	33.9	31.4	32.7	31.0	28.9	31.9	27.6	30.8	30.5	31.3	29.0	33.0	25.0

¹ Based on 24-hr dietary recall of day preceding interview.

² Excludes 36 breast-fed infants.

³ Excludes 4 breast-fed infants.

⁴ Excludes 40 breast-fed infants.

Data Source: USDA nationwide food consumption survey, 1977-78, 48 conterminous States, spring 1977, preliminary Rpt. No. 2, September 1980, p. 104.

TABLE 3.—NUTRITIVE VALUE OF DINNER
[Percentage of a day's¹ intake per individual reporting dinner, spring 1977, 48 States, all urbanizations, all incomes]

Sex and age (years)	Individuals reporting dinner	Food energy	Protein	Carbo-hydrate	Fat	Calcium	Iron	Magnesium	Phosphorus	Vitamin A value	Thiamin	Riboflavin	Pri-form niacin	Vitamin B ₆	Vitamin B ₁₂	Vitamin C
Males and females:																
Under 1	278	34.6	24.1	27.2	25.4	22.3	23.4	18.8	23.5	24.1	33.1	18.5	22.3	21.9	25.4	25.3
1 to 2	427	42.7	31.1	37.4	35.5	25.0	24.6	29.6	29.7	30.5	33.1	24.6	25.7	33.7	30.9	26.7
3 to 5	437	41.8	36.9	43.7	41.1	32.6	30.5	38.6	34.8	36.3	33.3	31.3	30.8	41.6	40.7	33.5
6 to 8	469	45.0	36.8	42.5	41.0	30.5	26.0	36.7	34.4	34.8	33.3	29.9	28.2	39.8	38.0	30.1
Males:																
9 to 11	216	47.2	38.6	44.0	41.6	32.4	26.0	40.8	35.4	35.7	31.9	37.7	32.1	40.2	39.9	38.4
12 to 14	313	47.4	39.3	45.0	43.6	32.6	28.8	39.4	37.7	38.4	38.0	30.8	30.2	40.3	42.1	34.6
15 to 18	400	47.4	42.3	49.5	46.4	34.5	35.3	42.4	42.3	41.0	42.3	43.9	37.4	46.3	47.4	38.2
19 to 22	287	46.0	42.5	47.4	46.0	38.3	35.2	45.3	42.5	41.5	49.2	40.6	38.1	47.0	48.2	40.5
23 to 34	770	49.3	46.2	51.9	49.3	40.2	41.2	41.8	44.3	45.7	44.1	43.7	49.0	52.5	46.5	48.2
35 to 50	784	49.9	47.6	54.2	51.3	41.3	43.0	50.2	43.1	47.3	54.1	45.6	44.3	50.3	55.2	52.3
51 to 64	634	51.9	48.0	54.0	52.0	39.7	37.8	49.2	43.5	47.8	51.6	43.0	43.2	50.6	54.7	48.4
65 to 74	295	51.2	45.1	50.9	48.9	38.5	34.6	43.9	40.1	43.3	46.7	37.8	38.4	46.7	48.4	42.6
75 and over	127	58.8	44.6	51.5	46.9	38.5	35.2	46.2	41.5	43.7	44.4	40.3	39.2	49.5	52.2	41.9
Females:																
9 to 11	241	48.1	40.3	45.8	44.3	34.1	30.5	41.3	38.6	32.6	38.9	34.9	32.6	41.6	43.3	35.7
12 to 14	309	40.5	40.6	47.0	46.0	32.4	30.2	43.2	38.9	39.4	41.9	35.5	32.9	46.6	45.4	35.8
15 to 18	402	49.5	46.2	53.0	50.3	38.9	37.1	48.8	44.9	46.2	48.6	41.6	40.8	52.6	51.2	43.7
19 to 22	337	47.9	49.0	54.9	54.0	40.5	39.6	51.1	47.0	48.7	51.6	45.6	44.8	55.2	55.8	47.2
23 to 34	949	49.1	47.8	54.3	52.3	40.2	39.2	50.0	44.0	47.3	51.0	46.0	44.6	52.6	54.7	47.6
35 to 50	942	51.7	50.1	56.7	54.6	40.2	39.5	51.5	42.8	49.6	52.1	45.4	45.2	53.0	57.9	46.5
51 to 64	792	50.8	48.2	54.0	53.3	39.3	36.8	49.2	41.4	46.7	51.8	43.4	42.9	50.5	54.4	47.3
65 to 74	377	54.6	46.5	52.8	50.9	39.1	36.2	46.8	41.6	46.0	49.8	41.4	41.6	49.9	51.1	46.6
75 and over	197	55.7	43.7	49.7	49.1	36.2	33.4	44.4	38.8	42.5	50.7	36.1	39.4	47.0	49.5	42.8
All individuals	4,9620	48.9	45.0	51.2	49.1	37.6	35.7	46.2	41.3	44.2	47.6	40.5	39.9	48.3	50.6	44.1

¹ Based on 24-h dietary recall of day preceding interview.

² Excludes 36 breast-fed infants.

³ Excludes 4 breast-fed infants.

⁴ Excludes 40 breast-fed infants.

Data source: USDA nationwide food consumption survey, 1977-78, 48 conterminous States, spring 1977, preliminary rpt. No. 2, September 1980, p. 106.

TABLE 4.—NUTRITIVE VALUE OF SUPPER
(Percentage of a day's¹ intake per individual reporting supper, spring 1977, 48 States, all urbanizations, all incomes)

Sex and age (years)	Individuals (numbers)	Individuals reporting supper	Food energy	Protein	Carbohydrate	Calcium	Iron	Magnesium	Phosphorus	Vitamin A value	Thiamin	Riboflavin	Pre-formed niacin	Vitamin B ₆	Vitamin B ₁₂	Vitamin C
Males and females:																
Under 1	278	65.1	21.7	22.5	20.6	23.7	16.8	19.1	23.1	19.6	24.3	18.3	17.6	23.5	22.4	17.6
1 to 2	3264	60.5	32.9	38.1	35.5	28.0	23.4	33.4	32.2	31.1	28.4	27.6	25.5	40.2	36.4	28.0
3 to 5	437	60.6	35.5	42.0	39.2	30.7	28.1	35.8	36.0	31.7	30.7	29.2	29.1	32.7	32.9	31.5
6 to 8	469	56.1	36.3	42.4	40.0	30.7	26.8	37.9	35.1	32.2	32.2	29.1	29.1	33.5	33.5	32.7
Males:																
9 to 11	216	53.7	36.3	42.5	39.3	31.0	28.3	36.5	33.8	36.1	29.4	31.0	29.4	38.3	36.3	33.0
12 to 14	313	58.7	38.1	44.4	40.9	32.2	28.3	40.3	36.4	37.0	38.9	32.8	30.6	43.6	43.3	36.5
15 to 18	400	54.2	44.5	44.5	41.7	34.7	32.2	42.2	39.8	38.9	35.4	33.8	34.5	43.3	43.3	38.8
19 to 22	287	54.8	43.2	48.9	45.4	37.6	33.7	46.6	42.1	42.2	40.5	43.2	40.5	37.7	48.0	41.6
23 to 34	770	49.4	46.7	52.5	49.9	40.1	40.6	49.0	45.6	47.8	49.6	44.6	44.3	49.9	54.2	47.9
35 to 50	784	51.3	45.6	50.6	47.5	41.6	41.6	45.5	45.6	47.9	47.9	41.0	41.0	47.7	51.9	50.0
51 to 64	634	51.5	44.0	48.7	46.9	39.9	39.5	38.0	46.1	40.0	44.5	45.1	40.5	40.2	45.2	46.9
65 to 74	295	55.1	37.5	42.5	39.4	32.6	32.5	38.2	35.5	37.8	36.6	32.8	34.9	38.8	41.7	40.9
75 and over	127	54.2	37.5	38.4	39.2	35.1	35.1	35.2	34.0	35.6	41.3	34.0	34.4	37.6	37.3	39.6
Females:																
9 to 11	241	54.8	35.9	42.9	38.1	30.4	26.3	37.8	33.6	35.7	32.8	30.6	29.3	39.4	38.6	33.3
12 to 14	309	57.2	38.9	46.1	40.9	33.2	30.8	41.9	39.2	36.0	35.8	34.1	44.1	45.6	36.6	37.1
15 to 18	402	50.8	44.1	50.7	47.1	38.5	37.4	46.1	42.9	44.2	41.5	40.5	44.0	48.7	42.7	39.3
19 to 22	337	45.7	45.3	52.4	47.1	39.3	38.9	49.6	45.2	47.0	47.5	44.0	44.1	55.1	53.8	47.7
23 to 34	949	47.6	46.6	52.5	50.3	40.5	40.1	48.3	44.1	47.2	48.8	45.4	43.6	49.6	46.6	46.9
35 to 50	942	48.5	44.1	49.4	46.6	39.2	36.4	44.5	44.3	44.8	40.7	40.1	45.8	49.5	44.1	43.9
51 to 64	792	51.8	44.4	49.3	48.2	37.5	37.6	44.7	39.8	44.3	46.4	39.4	41.3	45.1	49.7	45.5
65 to 74	377	51.7	38.0	41.7	40.4	33.7	33.5	37.6	33.1	37.7	38.8	32.3	35.2	38.9	40.6	40.2
75 and over	197	54.2	36.4	37.9	34.8	35.6	34.9	32.2	36.7	34.6	33.5	36.0	34.9	34.2	36.6	28.9
All individuals	49,620	52.4	41.5	47.0	44.3	36.1	34.4	42.7	39.1	41.5	41.4	37.8	37.2	44.3	46.3	40.7

¹ Based on 24-hr dietary recall of day preceding interview.

² Excludes 36 breast-fed infants.

³ Excludes 4 breast-fed infants.

⁴ Excludes 40 breast-fed infants.

Data source: USDA nationwide food consumption survey, 1977-78, 48 conterminous States, spring 1977, preliminary, Rpt. No. 2, September 1980, p. 108.

TABLE 5.—NUTRITIVE VALUE OF SNACKS¹
[Percentage of a day's² intake per individual reporting snacks, spring 1977, 48 States, all urbanizations, all incomes]

Sex and age (years)	Individuals reporting snacks (number)	Food energy	Protein	Carbohydrate	Calcium	Iron	Magnesium	Phosphorus	Vitamin A value	Vitamin Thiamin	Riboflavin	Pre-formed Vitamin niacin	Vitamin B ₆	Vitamin B ₁₂	Vitamin C
Males and females:															
Under 1	378	85.8	35.7	34.3	37.3	33.4	37.7	25.6	33.8	36.4	31.1	34.4	23.2	32.2	39.4
1 to 2	264	69.1	23.1	17.9	20.5	27.0	28.3	24.8	24.0	17.0	18.9	25.1	11.2	17.4	22.4
3 to 5	437	58.7	19.9	10.9	16.4	26.2	12.6	17.9	15.6	13.6	14.0	10.3	12.4	12.7	23.5
6 to 8	469	65.3	17.3	14.5	22.1	17.2	10.8	16.0	14.5	11.8	11.4	14.2	8.6	9.7	19.1
Males:															
9 to 11	216	67.9	19.1	12.5	17.1	23.5	18.4	13.1	20.4	16.7	14.1	13.5	12.0	12.4	14.4
12 to 14	313	63.0	20.7	14.1	18.7	25.4	20.2	15.7	20.9	18.2	14.7	17.3	19.1	15.2	11.5
15 to 18	400	65.1	22.6	14.7	19.0	28.9	21.4	16.6	21.4	19.4	15.4	17.9	14.3	15.4	15.4
19 to 22	287	55.4	22.9	14.8	16.9	28.5	21.1	15.9	23.9	21.1	16.0	15.3	20.2	18.3	18.2
23 to 34	770	62.5	19.7	11.9	14.4	24.9	19.7	12.9	22.6	18.0	12.8	13.2	13.0	14.0	19.6
35 to 50	784	60.5	18.4	10.6	13.6	22.5	12.0	12.0	22.5	17.1	10.4	12.5	17.1	15.1	14.6
51 to 64	634	57.9	16.8	10.7	12.7	20.6	19.9	11.6	19.7	16.0	12.3	12.0	16.0	12.8	10.5
65 to 74	295	56.1	13.6	10.6	13.4	19.0	9.6	15.2	15.1	12.1	11.1	15.4	9.8	12.4	12.3
75 and over	127	39.3	14.3	10.3	12.0	18.8	18.1	10.3	16.3	14.6	9.7	12.3	15.8	10.4	10.8
Females:															
9 to 11	241	66.2	18.6	10.7	16.7	23.4	15.2	13.0	17.6	14.4	12.4	11.8	13.8	11.0	10.4
12 to 14	309	69.5	20.9	12.9	18.8	26.0	18.5	14.8	19.7	16.7	14.8	15.5	16.5	13.5	12.8
15 to 18	402	61.4	21.8	13.5	17.8	28.4	22.4	15.5	21.6	17.6	16.3	18.5	13.3	15.1	13.8
19 to 22	337	60.2	20.9	12.8	15.4	27.8	21.5	15.2	20.9	18.7	16.4	15.3	17.4	13.2	20.5
23 to 34	949	63.9	20.8	12.1	14.8	27.7	21.1	15.4	23.5	18.4	12.7	14.5	17.9	15.0	16.6
35 to 50	942	61.8	17.6	10.5	13.6	22.9	20.1	13.4	21.4	16.0	14.1	13.3	13.1	12.1	16.0
51 to 64	792	59.0	18.0	11.7	14.6	22.2	21.0	13.2	20.1	16.6	12.3	14.5	16.9	12.1	11.9
65 to 74	377	48.6	17.1	11.5	14.6	22.0	21.1	11.6	17.1	16.1	12.5	14.5	17.9	12.1	14.5
75 and over	197	41.9	17.8	13.3	15.4	21.1	13.8	19.2	21.1	16.6	15.1	15.4	18.1	14.6	13.5
All individuals	5,9620	60.9	19.5	12.3	15.6	24.5	20.5	13.6	20.9	17.5	13.6	14.3	17.4	13.5	12.7

¹ Includes all occasions other than breakfast, lunch, dinner, or supper.

² Based on 24-hr dietary recall of day preceding interview.

³ Excludes 36 breast-fed infants.

⁴ Excludes 4 breast-fed infants.

⁵ Excludes 40 breast-fed infants.

Data source: USDA nationwide food consumption survey, 1977-78, 48 conterminous States, spring 1977 (preliminary).

NUTRIENTS IN FOODS AT HOME AND AWAY

(By Patricia M. Guenther and Carolyn A. Chandler, Consumer Nutrition Center, Human Nutrition, Science and Education Administration)

The household survey phase of the nationwide food consumption survey 1977-78 (NFCS 77-78) has pointed up the increasing importance of eating out in the national food pattern. During the past decade eating out has become increasingly common among members of U.S. households. In 1965, meals and snacks bought and eaten away from home accounted for about 17 cents out of the average household food dollar. By 1977, the eating out share had reached 24 cents of the food dollar, an increase of about 40 percent.¹ In addition, some meals that were eaten out were not paid for fully by household funds. Examples include school lunches, congregative meals for the elderly, and foods charged to expense accounts.

The changes in eating habits raise questions concerning the nutritional contributions of at-home and away-from-home foods to the U.S. diet. For answers to such questions, we turn to the individual food intake phase of the NFCS 77-78. In this phase, information was obtained on all foods and beverages ingested at home and away from home by members of a national sample of households.² Information was collected from 9,620 individuals living in the 48 conterminous States in April-June 1977. This count was weighted to adjust for irregular response rates of households surveyed. Trained interviewers inquired about the food that individuals ate on the day preceding the interview.

The nutritive value of food intakes (excluding vitamin and mineral supplements) was calculated for food energy and 14 nutrients by use of a special nutrient data base constructed from food composition values from Agriculture Handbook No. 8 and unpublished data provided by the Department's Nutrient Data Research Group. The average nutrient values of food intakes at home and away were calculated for individuals divided into 22 sex-age groups.

In this report, food eaten out or food away from home refers to food that was obtained and eaten outside the individual's home, for example, in a restaurant, at school, at work, or at someone else's home. Food that was purchased at a store and eaten away from home is also considered food away. On the other hand, food that is carried from the home and eaten elsewhere, such as bag lunches and picnics, is from the home food supply and is considered food at home.

¹ Consumer Nutrition Center. 1980. Money value of food used by households in the United States, spring 1977. Prelim. Rept. No. 1. U.S. Dept. Agr., 17 pp. This report was based on data collected from housekeeping households—the 97 percent having at least 1 person having 10 or more meals from the household food supply during the 7 days preceding the interview.

² Housekeeping and nonhousekeeping households.

We will discuss the proportions of men, women, and children who had food away from home on the day reported in 1977 and in a similar survey in 1965. Next, we will report the percentage contributions of food at home and away from home for selected nutrients and sex-age groups, then discuss the contributions of five major food groups to intakes at home and away from home for the selected nutrients. Space limitations preclude a discussion of all of the seven vitamins and four minerals calculated for the survey. Vitamin A,³ vitamin C, vitamin B₆, iron, and calcium were chosen because of their general interest and concern to nutritionists.

INDIVIDUALS EATING AWAY FROM HOME

Forty-four percent of the individuals surveyed had food or beverage away from home on the day reported. This proportion increased progressively with age from 6 percent for infants to a peak among men of 60 percent for 23- to 34-year-olds and to a peak among females of 55 percent for the 12- to 14-year-olds. The percentage eating away from home then decreased with age to 23 percent for men and women age 65 to 74 and to about 16 percent for those 75 and older.

Percentages for those eating out for males under age 22 and over 65 were similar to those for females. However, many more men than women age 23 to 64 ate away from home.

In the 1965 survey, 39 percent of the individuals obtained and ate some food away from home compared with 44 percent in 1977. The sex-age group with the greatest increase since 1965 was the 23- to 34-year-old women. In 1965, 35 percent of this group had food away from home on the day surveyed; in 1977, close to 50 percent ate out. The next largest increase was for the 3- to 5-year-olds; 24 percent of them had food away from home in 1965 compared with 33 percent in 1977. These increases probably reflect the greater numbers of young women in the work force and the care of their children outside the home.

ENERGY FROM FOOD AT HOME AND AWAY

The shares of food energy and the energy-providing nutrients—fat, protein, and carbohydrate—from food away from home were almost identical (18.5 to 19) for all individuals studied. However, proportions varied considerably by the sex and age of individuals (table 1). Non-breast-fed infants received only 2 percent of their energy intakes from foods eaten away from home; almost all of their food was from home supplies. But by age 1 and 2 about 10 percent came from foods away from home. This proportion increased with age to about 25 percent for men and women 19 to 34 years old. Eating out supplied steadily less food energy as age increased—only about 11 percent for people 65 to 74.

For this study, foods were classified into five major groups: the milk and milk products group, the meat-egg group, the grain products group, the fruits and vegetables group, and the fats-sweets-beverages (or "other") group. Milk and milk products include cheese, yogurt,

³ "Vitamin A" throughout this paper refers to the vitamin A value of foods calculated from data for preformed vitamin A, beta-carotene, and other carotenoid precursors of vitamin A.

cream, and milk product mixtures such as puddings and cheese sandwiches. The meat-egg group also includes fish, poultry, and mixtures having these foods as a main ingredient such as sandwiches, stews, and TV dinners. The grain products group includes breads, rolls, biscuits, other baked goods, cereals, pastas, and their mixtures.

The fruits and vegetables group includes juices, legumes, nuts, and seeds. The last group, "other," includes beverages such as coffee, tea, soft drinks, fruit drinks, fruit ades, and alcoholic drinks, and sweets, sugar, fats, and oils that were reported separately by the respondent.

About 80 percent of the day's energy intake came from foods at home, and about 20 percent came from away-from-home foods (table 2). The meat-egg group contributed the largest proportion of energy in foods at home and away. Foods in the meat-egg group contributed 25 percent of the day's energy intake at home, and foods in this group supplied 6 percent away from home. The next largest energy source was the grain products group with about 20 percent of the day's energy coming from grain products at home and 4 percent coming from grain products eaten away. At-home fruits and vegetables made a slightly greater contribution to energy (14 percent) than did milk (12 percent) or the foods in the "other" category (10 percent). The food energy coming from these three food groups away from home was evenly divided (2 to 3 percent each).

The contributions of the five food groups to energy at home and away from home are compared in the following tabulation:

[In percent]

	Foods at home	Foods away
Milk, milk products	14.3	11.7
Meat, egg	30.5	33.5
Grain products	25.7	22.9
Fruits, vegetables	16.7	14.4
Fats, sweets, beverages	12.9	17.0
All foods	100.0	100.0

The meat-egg group and the fats-sweets-beverages group provide proportionately more energy among the foods away from home than among foods eaten at home; whereas, the opposite is true for the other three groups.

The meat-egg group supplied the largest proportion of protein in the diets as would be expected (table 2). Foods in this group from the home food supply provided about 40 percent of protein. Within the group, eggs provided 4 percent. The meat-egg group eaten away from home supplied another 10 percent of protein. The contribution from eggs away was only 0.5 percent. Milk and milk products and grain products were equally important sources of protein among foods at home and away. Each supplied 15 percent of total protein intake at home and about 3 percent away from home. Fruits and vegetables at home were the source of about 10 percent of protein and provided less than 2 percent of protein away from home.

The meat-egg group was also the major source of fat in the diet. Foods in this group from the home food supply contributed 37 percent of all fat, and their away-from-home contribution was 9 percent. Milk and milk products were the next most important source of fat

with their at-home contribution of 14 percent and their away-from-home contribution of 3 percent. The other three major food groups contributed approximately equal amounts of fat to the diet—10 percent each in foods at home and 2 to 3 percent in foods eaten away.

VITAMINS A, C, AND B₆ FROM FOOD AT HOME AND AWAY

Foods at home and foods away from home differed more in their contents of vitamins A and C than they did for any other nutrients. Foods at home supplied a larger proportion of vitamin A and vitamin C than they did of the energy nutrients. For older adults (65 to 74), however, foods at home supplied the same proportion of vitamin A as they did of energy.

By age 3 to 5, children were receiving 10 percent of their vitamin A from foods away from home (table 1). Teenage boys (15 to 18 years) received 16 percent of their vitamin A from foods away and teenage girls, 21 percent. Among men, those aged 23 to 34 had the highest proportion (22 percent) of vitamin A coming from foods away; the peak for women (23 percent) was with the 19- to 22-year-olds. By age 65 to 74 this proportion had fallen to about 10 percent.

Fruits and vegetables from home food supplied 35 percent of the day's vitamin A intakes, and fruits and vegetables away from home supplied another 7 percent (table 2). The contribution of each category of fruits and vegetables to the day's intake of vitamin A is shown in the following tabulation:

[In percent]

	Foods at home	Foods away
Fruits:		
Citrus and tomatoes	7.7	1.4
Noncitrus	4.1	.5
Vegetables:		
White potatoes	1.6	.5
Dark green and yellow	8.0	1.3
Legumes, nuts, seeds	.5	.1
Other	13.2	3.2
Total	35.1	7.0

As expected, tomatoes and dark green and deep yellow vegetables were important sources of vitamin A. The contribution of white potatoes to intake of vitamin A came mainly from added butter or margarine. Legumes, nuts, and seeds supplied negligible amounts. The remaining vegetables provided the largest proportion, 13 percent at home and 3 percent away.

The milk, meat-egg, and grain products groups contributed 12 to 16 percent each to intakes of vitamin A at home and 2 to 3 percent each away. Eggs accounted for over a third of the meat-egg group's contribution at home (4.8 percent of the 12.5 percent) and only a fifth of this group's contribution away from home (0.6 percent of the 3.2 percent). Eggs were eaten much more frequently at home than away from home.

The percentage contributions of foods at home and away to vitamin C intakes were very similar to those for vitamin A. The proportions coming from away-from-home foods were highest (21 to 22 percent) in

the 19- to 22-year-old age group. Fruits and vegetables were major sources of vitamin C. Those at home furnished nearly 60 percent of the total day's intake, and those away furnished another 10 percent. The contribution of each category of fruits and vegetables is shown below:

[In percent]

	Foods at home	Foods away
Fruits:		
Citrus and tomatoes.....	24.3	2.5
Noncitrus.....	7.4	.9
Vegetables:		
White potatoes.....	10.7	3.9
Dark green and yellow.....	3.6	.5
Legumes, nuts, seeds.....	.5	.1
Other.....	11.8	2.5
Total.....	58.3	10.4

Citrus fruits and tomatoes supplied a quarter of the vitamin C, most of it from home food supplies. Among all foods eaten away, potatoes were the most important source of vitamin C, supplying 4 percent of the total intake. The remaining four major food groups supplied 4 to 8 percent of vitamin C intake from foods at home and 1 to 2 percent each from foods away from home.

Sources of vitamin B₆ were more evenly distributed among the food groups than were sources of vitamin A and vitamin C. About 83 percent came from food at home—33 percent came from the meat-egg group, 22 percent from fruits and vegetables, 17 percent from grain products, 9 percent from milk and milk products, and essentially none from fats, sweets, and beverages. About 17 percent of vitamin B₆ came from foods away from home—9 percent from the meat-egg group and 8 percent from the remaining food groups together.

CALCIUM AND IRON FROM FOOD AT HOME AND AWAY

About 18 percent of calcium intake came from foods eaten out by all individuals studied. Levels were 1 percent for infants, 12 percent for 3- to 5-year-olds, and 20 percent for 6- to 8-year-olds (table 1). This level of 20 percent away from home remained fairly constant through age 14 for females and through age 22 for males. Proportions peaked at 24 percent for females at age 15 to 18 and for males at age 23 to 34. By age 65 to 74, food away from home contributed 8 to 10 percent of calcium intake.

Food from home supplies contributed 82 percent of the day's calcium. Thirty-nine percent came from milk and milk products (table 2). The contribution of the grain group was about half that of the milk group (19 percent). Fruits and vegetables contributed 12 percent and the meat-egg group 9 percent. The highest contributor of calcium for food away was the milk group followed by the grain products group with 7 percent and 4 percent, respectively. The three remaining food groups together furnished 7 percent.

Food eaten out provided about 18 percent of the day's iron intake for all individuals studied. Foods away provided 13 percent of the iron

intake for children 3 to 5 (table 1), with about 25 percent for adults 23 to 34 and declined to about 10 percent for adults 65 to 74.

For food at home, the meat-egg and the grain groups each furnished about 29 percent of iron intake, and fruits and vegetables provided 17 percent. Among foods away, the meat-egg group contributed another 8 percent, and the grain products accounted for half that much (4 percent).

Infants' food sources of iron varied greatly from that of other age groups. They received 98.5 percent of their iron from home food supplies. Grain products provided 46 percent; milk products, 28 percent; fruits and vegetables (including soy-based formulas) 16 percent; and the meat-egg group, 8 percent.

WHERE MEALS AND SNACKS AWAY FROM HOME WERE EATEN

Of the eating occasions (meals and snacks) reported, 77 percent were eaten at home. Another 4 percent consisted entirely of foods from home supplies that were eaten away from home, such as bag lunches and picnics. Eighteen percent consisted of foods obtained and eaten away from home, and the remaining 1 percent had a combination of these food sources.

The percentages of eating occasions with all foods obtained and eaten away from home at various types of eating places by selected sex-age groups appear in the following tabulation:

Sex and age (years)	Occurrences away from home (percent of all occasions)	Percent of occasions away						
		Restau- rant	Fast food place	Work	School	Someone else's home	Store	
Children, 3 to 5-----	12	4	7	0	21	54	1	13
Males, 15 to 18-----	21	5	18	8	34	18	9	8
Females, 15 to 18-----	23	13	24	3	27	17	6	10
Males, 23 to 34-----	28	23	16	29	1	17	5	9
Females, 23 to 34-----	22	19	10	27	1	28	4	11
Males, 65 to 74-----	8	37	8	7	1	27	4	16
Females, 65 to 74-----	8	28	1	7	0	31	1	32
All Individuals-----	18	18	13	21	11	20	4	13

Note: Meals and snacks consisting entirely of foods obtained and eaten away from home for 3- to 5-year-olds made up 12 percent of all their eating occasions. Over half of these occasions were at someone else's home, 21 percent at school, and another 7 percent at day care centers (listed under "other").

Teenagers 15 to 18 years had about 22 percent of their meals and snacks away, and the largest proportion of these occasions were at school—34 percent for boys and 27 percent for girls. Fast food places accounted for 18 percent of teenage boys' (15 to 18 years) meals and snacks away, and another 18 percent of the away-from-home eating occasions were at someone else's home.

Men and women 23 to 34 years had about 28 percent of their away-from-home meals and snacks at work. By this age, restaurants were frequented more often than fast food places. Older men and women ate less than 10 percent of their meals and snacks away from home. They were more likely to patronize a restaurant or take a meal or snack in another person's home than to eat at a fast food place.

SUMMARY

Foods eaten away from home make important contributions to nutrient intakes. Eating away from home increased between 1965 and 1977. Forty-four percent of the individuals surveyed in 1977 obtained and ate food away from home compared with 39 percent in 1965. Women aged 23 to 34 and children 3 to 5 years old showed the largest increases.

On the average, foods eaten out provided 19 percent of energy, protein, fat, and carbohydrate and 15 to 18 percent of the vitamins and minerals studied. The nutrient contribution of food away from home varied with age of individuals from 1 to 2 percent of the day's intake for infants up to 20 to 25 percent for young adults (19 to 34 years). The nutrient contribution of food away then decreased with advancing age to about 10 percent.

TABLE 1.—NUTRITIVE VALUE OF FOOD OBTAINED AND EATEN AWAY FROM HOME
[Percentage of a day's¹ intake per individual, spring 1977, 48 States, all urbanizations, all incomes]

Sex and age (years)	Individuals eating away (percent)	Individuals (number)	Food energy	Protein	Fat	Carbo- hydrate	Calcium	Iron	Magne- sium	Phos- phorus	Vita- min A	Thiamin	Ribo- flavin	Pre- formed niacin	Vita- min B ₆	Vita- min B ₁₂	Vita- min C
Males and females:																	
Under 1:																	
1 to 5	2.78	6.4	1.9	1.7	2.1	1.8	1.4	1.5	1.5	1.5	2.0	0.8	1.1	2.0	1.7	2.1	
6 to 8	264	25.0	9.6	9.7	9.7	9.7	8.7	8.3	8.4	7.3	7.8	9.4	8.1	8.4	7.9	8.1	
9 to 11	437	33.4	14.3	13.9	14.4	14.3	11.9	13.1	13.0	10.4	12.2	12.4	12.2	12.4	12.2	11.7	
12 to 14	469	19.7	19.6	19.8	20.2	19.1	20.5	17.0	18.7	19.8	17.0	16.7	18.7	17.6	19.6	17.3	
Males:																	
9 to 11	216	51.4	20.2	19.9	20.8	20.1	20.0	18.1	18.7	19.5	18.3	16.8	18.7	18.6	18.0	18.0	
12 to 14	313	50.0	19.8	19.6	19.6	20.1	22.0	17.7	17.6	17.3	17.8	19.6	17.3	17.3	20.3	16.8	
15 to 18	400	55.0	21.2	20.7	21.5	21.4	20.6	19.0	19.4	20.8	16.0	18.6	19.7	17.9	20.6	15.3	
19 to 22	287	52.3	24.3	23.4	23.8	24.3	20.7	22.0	22.8	22.0	20.7	20.6	22.9	22.7	22.7	21.9	
23 to 34	770	60.4	25.6	25.7	26.5	26.7	24.3	25.8	25.0	25.6	24.7	24.5	24.7	25.4	25.4	21.1	
35 to 50	784	54.3	22.0	21.5	21.6	22.3	20.6	21.1	21.5	19.5	20.2	21.1	22.1	20.7	21.4	19.1	
51 to 64	634	39.0	15.2	15.2	15.0	14.1	14.5	14.0	14.8	13.8	13.5	14.5	14.3	14.3	14.9	11.8	
65 to 74	295	23.1	10.7	11.0	9.8	7.7	9.7	8.8	9.4	8.7	8.1	10.5	9.4	9.4	9.4	8.4	
75 and over ²	127	16.5	7.6	8.2	8.3	6.4	5.7	7.1	6.8	7.1	6.6	5.8	5.7	7.0	7.3	6.1	
Female:																	
9 to 11	241	49.4	20.3	21.0	21.7	19.4	20.8	18.3	18.7	20.3	16.7	17.2	19.3	18.4	17.5	20.5	
12 to 14	309	55.3	19.9	19.9	20.0	20.7	19.6	17.6	18.9	15.6	17.5	18.2	17.9	18.7	18.7	16.0	
15 to 18	402	52.2	24.6	25.0	25.3	25.1	23.7	23.6	24.6	20.7	21.3	23.2	23.5	23.5	24.6	19.6	
19 to 22	337	50.1	25.1	24.5	24.5	25.5	22.6	24.6	24.3	24.3	22.9	23.5	24.7	24.7	24.7	21.2	
23 to 34	949	47.5	23.6	23.0	24.1	22.9	21.5	23.0	22.2	22.6	21.4	22.3	23.1	22.4	22.4	21.0	
35 to 50	942	40.6	18.0	17.5	18.3	17.6	16.8	17.1	16.4	17.3	15.9	16.5	16.6	17.1	16.8	15.1	
51 to 64	792	32.8	13.3	12.9	13.9	11.9	12.8	11.9	12.2	11.8	11.9	12.4	12.4	11.9	12.8	9.9	
65 to 74	377	23.1	11.6	12.1	12.4	10.4	9.9	10.7	9.7	11.0	10.7	9.5	10.4	11.2	10.6	9.1	
75 and over	197	15.2	7.4	8.4	8.5	5.9	6.5	6.8	6.2	7.4	6.2	5.9	6.7	7.3	7.3	5.3	
All individuals	4,9620	43.7	18.8	18.5	19.0	18.6	17.5	17.6	18.2	16.2	16.7	17.3	18.0	17.2	17.9	15.4	

¹ Based on 24-hr. dietary recall of day preceding interview.

² Excludes 36 breast-fed infants.

³ Excludes 4 breast-fed infants.

⁴ Excludes 40 breast-fed infants.

Data source: USDA nationwide food consumption survey, 1977-78, 48 conterminous States, spring 1977, preliminary rpt. No. 2, September 1980, p. 106.

TABLE 2.—CONTRIBUTION OF FOOD GROUPS AT HOME AND AWAY TO NUTRIENT INTAKES
 [Average per individual in a day, spring 1977; in percent]

Food group	Food energy		Protein		Fat		Calcium		Iron		Vitamin A		Vitamin B ₆		Vitamin C	
	Home	Away	Home	Away	Home	Away	Home	Away	Home	Away	Home	Away	Home	Away	Home	Away
Milk, milk products	11.6	2.2	15.1	2.6	14.1	2.7	39.0	6.8	3.0	0.6	15.8	3.1	9.3	1.5	6.5	0.9
Meat, egg, fish	24.8	6.3	40.7	10.8	36.7	8.9	3.7	3.1	29.9	8.1	12.5	3.2	33.2	8.8	3.9	1.9
Grain products	20.9	4.3	15.5	3.2	11.7	3.1	18.7	4.0	28.7	4.4	14.2	2.1	16.6	2.1	7.9	1.3
Fruits, vegetables	13.6	2.7	9.4	1.8	9.3	2.7	12.4	2.2	16.6	3.2	35.1	7.0	21.9	4.1	58.3	10.4
Fats, sweets, beverages	10.5	3.2	.8	.3	9.0	1.6	3.7	1.3	4.3	1.4	5.9	.8	1.6	.8	6.5	1.0
All foods	81.2	18.8	81.5	18.5	80.9	19.0	82.5	17.5	82.3	17.7	83.6	16.2	82.7	17.2	83.1	15.5

Source: USDA Nationwide Food Consumption Survey 1977-78, 48 conterminous States, spring 1977 (preliminary).

NUTRITIONAL CONSEQUENCES OF COMMON MEAL PATTERNS

(By Helen A. Guthrie, Professor of Nutrition, Penn State University)

Critics of nutrition education efforts have attributed the lack of total success to a failure to recognize the usual patterns of food consumption among various population segments. The food intake data obtained from one 24-hour recall and from a 2-day food record by respondents in the 1977 USDA food consumption study provide an opportunity to describe the most frequent food patterns, their food components and nutritional consequences. Accordingly the study used an analysis of the reported intake of 8,778 individuals in the nationwide food consumption study in the spring of 1978 to provide a description of prevailing practices from which more meaningful education efforts could be developed.

To assure comparability of data, records were inspected to exclude those subjects differed in a major way from the majority. Thus those for whom records were incomplete for all 3 days (768), those of breast-fed infants (107), pregnant or nursing women (108), vegetarians (111) and miscellaneous others (337) were not considered leaving a total of 7,346 records of 83 percent of the original sample.

Food intake patterns based on the respondents self-reported characterization of each eating episode as a breakfast, lunch, brunch, dinner, supper or snack, were identified. On the basis of this it was found that 4,045 or 55 percent of the population—group A—consumed three meals for each of the 3 days of the study; 1,253 or 17 percent ate three meals for 2 days and two meals in the other—group B—525 or 7 percent—group C—had two meals for all 3 days and 628 or 9 percent—group D—had two meals on 2 days and three on the third thus these four variations represented the meal patterns of almost 90 percent of the total sample. In addition, while 1,621 or 22 percent said they ate no snacks, the remaining 78 percent reported eating from 1 to 12 snacks during the 3-day period observed. For those—in group B and D—who ate differently on one of the 3 days, there was no consistent pattern except that if Sunday was included in the reporting period it tended to differ from the preceding or following days.

The nutritional consequences of each of these patterns was assessed by computing for each individual the average nutrient intake of calories, carbohydrate, fat, protein, calcium, iron, magnesium, vitamin A, ascorbic acid, thiamin, riboflavin, pyridoxine, and vitamin B₁₂. Each of these was then related to the appropriate recommended dietary allowance to compute a nutrient adequacy ratio—intake/recommended dietary allowance. These adequacy ratios for individuals in each of the major food patterns were then tabulated and summarized according to the extent to which they met recommended allowances (tables 1 to 4).

From these tables it is evident that regardless of the number of snacks consumed people who reported eating three meals for 3 days—group A—had diets that more adequately provided nutrient requirements than did those who had three meals for 2 days and two on the third—group B. These in turn reported eating foods providing a slightly more adequate intake than those on two meals for 3 days—group C—or for 2 days—group D.

While data for almost all nutrients followed the same pattern, both diets with three meals on 2 or more days being more adequate than those with two meals on 2 or 3 days, it is evident that the adequacy of diets in any group varied greatly from one nutrient to another. For instance, 90 percent of the individuals who had three meals a day for 2 or 3 days had intakes providing close to 100 percent of the recommended level of protein, approximately 65 percent had the same level of adequacy for vitamin C while only one-third and one-fifth achieved comparable intakes for calcium and vitamin B₆ respectively. Thus while some patterns were associated with significantly better nutritional profits than were others, even those best patterns were characterized by several nutritional deficits failing to result in intakes of even 60 to 70 percent of the RDA for two-thirds of the respondents. As has been reported in other reports on this Nationwide Food Consumption Study calcium, vitamin B₆ and iron—for women—are the most commonly limiting nutrients. The fact that the median energy intake was approximately 80 percent of estimated needs in groups A and B and 70 percent in groups C and D may account for the observed nutrient intakes below recommended levels.

The data were inspected further to determine if differing food consumption patterns were associated with differing contributions of protein, carbohydrate fat and foods of low nutrient density—sugar, fats, and oils, alcohol, and cakes and pastries—to the calorie intake. Those eating three meals on all 3 days obtained a higher proportion of these calories from carbohydrate and less from fats and foods of low nutrient density (LND). The percentage calories from protein increased progressively from groups A to D, with approximately 15 percent of all subjects obtaining 20 percent of their energy from protein and 98 percent receiving at least 10 percent. Comparable figures for LND foods were 37 percent and 75 percent of all subjects.

In addition to assessing the nutritional consequences of the most common food patterns regardless of the number of snacks reported, the analysis was intended to assess impact of increasing numbers of snacks on nutrient intake. Our analysis failed to support the commonly held view that snacks are low nutrient density. As the number of snacks increased from zero to 12 per 3-day period, there was a decline in the percent of subjects in each food pattern category 20 percent or more of their calories from low nutrient density foods.

Continuing work will specify the kinds and amounts of foods which were included in reports of meals—that is what is identified as breakfast, as lunch, brunch, dinner or supper in self reports of meals. Additionally the number of foods additionally reported, the range within food groupings and the distribution of energy intake in relation to other nutrients will be analyzed.

Information on the demography of people using each food pattern will be essential if this information is to be useful as a basis for nutrition education thrusts.

TABLE I.—ADEQUACY OF DIETS FOR 4,045 INDIVIDUALS REPORTING THAT THEY ATE 3 MEALS PLUS SNACKS ON EACH OF 3 DAYS

[Percent of subjects]

Nutrient, percent RDA	Pro	C	Iron	Mg	Vitamin A	Thiamin	Riboflavin	B ₆	B ₁₂	Vitamin C
100	93.2	35.1	51.1	27.1	54.3	62.9	73.7	23.0	71.8	68.4
90	96.1	43.1	58.7	40.5	60.6	73.9	81.7	32.6	77.7	72.4
80	98.2	53.2	66.1	54.7	68.4	82.7	88.3	44.4	84.0	76.8
60	99.8	74.1	83.7	82.4	82.0	95.0	97.0	70.8	93.2	86.0
40	100.0	92.4	97.1	97.9	94.1	99.3	99.7	93.4	93.3	94.1
20	100.0	99.6	99.9	100.0	-----	99.9	100.0	99.9	99.9	99.0

TABLE II.—ADEQUACY OF DIETS OF 1,253 INDIVIDUALS REPORTING THAT THEY ATE 3 MEALS PLUS SNACKS ON EACH OF 2 DAYS AND 2 IN 1 DAY

[Percent of subjects]

Nutrient, percent RDA	Pro	C	Iron	Mg	Vitamin A	Thiamin	Riboflavin	B ₆	B ₁₂	Vitamin C
100	89.4	28.8	44.8	21.3	42.6	51.0	65.8	18.3	67.3	58.2
90	93.1	36.6	51.7	31.2	48.4	63.9	72.9	25.2	73.3	62.2
80	96.0	44.9	58.9	42.1	55.7	74.0	81.5	35.4	79.5	69.2
60	99.2	65.4	74.4	72.5	72.9	90.3	94.4	61.2	90.8	80.2
40	99.0	86.0	93.1	95.0	88.5	98.6	98.8	88.0	97.7	90.8
20	100.0	99.0	99.9	99.8	-----	99.8	99.4	99.0	99.2	97.2

TABLE III.—ADEQUACY OF DIETS OF 628 INDIVIDUALS REPORTING THAT THEY ATE 2 MEALS PLUS SNACKS ON EACH OF 2 DAYS AND 3 IN 1 DAY

[Percent of subjects]

Nutrient, percent RDA	Pro	C	Iron	Mg	Vitamin A	Thiamin	Riboflavin	B ₆	B ₁₂	Vitamin C
100	83.0	19.0	34.4	11.3	36.1	35.5	48.2	11.3	54.9	47.3
90	88.4	24.8	40.6	18.8	40.4	45.5	59.2	15.6	63.4	52.8
80	92.0	31.7	47.0	29.8	44.7	55.1	68.3	24.4	70.7	57.4
60	97.3	50.6	66.4	59.6	60.0	82.8	88.2	49.8	83.6	69.4
40	99.4	76.6	88.7	89.3	80.7	95.5	97.9	80.6	95.2	84.6
20	100.0	97.1	98.9	99.5	-----	99.8	99.8	98.7	99.4	96.0

TABLE IV.—ADEQUACY OF DIETS FOR 525 INDIVIDUALS REPORTING THAT THEY ATE 2 MEALS PLUS SNACKS ON EACH OF 3 DAYS

[Percent of subjects]

Nutrient, percent RDA	Pro	C	Iron	Mg	Vitamin A	Thiamin	Riboflavin	B ₆	B ₁₂	Vitamin C
100	78.1	13.9	37.9	9.0	31.2	32.8	36.4	8.2	51.8	40.2
90	84.6	20.6	44.6	13.9	34.9	42.3	49.1	11.4	56.6	43.8
80	89.8	26.3	50.5	23.0	40.4	54.7	60.8	18.5	65.0	50.3
60	97.2	45.9	67.4	51.8	52.2	78.7	82.9	44.0	79.2	61.7
40	99.5	73.0	88.4	84.8	72.2	93.9	96.6	77.5	90.7	81.9
20	100.1	94.7	99.4	99.2	-----	99.4	99.4	97.5	98.1	94.7

DIETARY ISSUES AND THE MARKETPLACE

(By Phyllis A. Lovrien, Vice President, Consumer Affairs, Oscar Mayer & Co., Madison, Wis.)

Not many years ago nutrition was considered a science of interest to almost no one. It was patriotic to be a member of the clean plate club, healthful to drink vitamin D-enriched milk, and that was about as much nutrition as people thought they needed to know.

How things have changed. An estimated 35 million Americans take unprescribed nutritional supplements and last year one in five American went on some type of diet. More than 300 Federal bills are pending in Congress with the word "nutrition" in the text and 14 Senate and 16 House committees are involved in some nutrition or food interest. This is the year the Government published "Dietary Guidelines," and well over \$12 billion dollars are being spent in 1980 for Federal feeding programs.

Public interest in the subject of dietary fitness is very high, and food industry response is impressive.

Restaurateurs are instituting salad and breakfast bars, menus are offering a wider-than-ever selection of light foods and foods cooked by other methods than frying, and calorie-counted menus are appearing in hotel coffee shops all over the country.

Food chains are competing with each other to develop the best nutrition information programs possible as a service to shoppers. Such programs make use of in-store consumer advisers, handout literature, and shelf-marking systems for foods that are suited to various diets. These programs are being used as a marketing tool as frequently as price.

And supermarket shelves are bursting with products carrying nutrition information on their labels. Some brands of nearly all prepackaged products are labeled for their dietary properties. Generally, it is the top-of-the-line brands but some private labels, too. Those few product categories for which no brand is nutritionally labeled are conspicuous by their absence, and often the foods not perceived as nutritious. Lack of such information in a whole product category may be fostering negative false perceptions when such a wide range of foods do carry this information, including products considered high in calories—peanut butter, flour, and cake mixes, for example.

It's impressive to see what's happening in the labeling of "low sodium" and "no salt added" products as well.

Once relegated to the special diet section, hundreds of new formulations of old favorites are now found all over the store, often side by side to their traditional counterpart—"lite" cheese, diet margarine, imitation low-fat mayonnaise, tuna packed in water rather than oil or broth, whole lines of diet salad dressings, high-fiber bread, low sodium

V-8 juice, "lite" peaches packed in their own juice, no cholesterol egg replacement, and on and on. Most cater to those interested in reducing fat, cholesterol, saturated fat, sugar, or sodium in their diets.

Many companies are aggressively marketing nutrition—by disclosing dietary factors on product labels, by reformulating products and by advertising the virtues of these products through the mass media. Many have also developed extensive nutrition information and education programs.

All of this voluntary activity is in response to the widespread general interest in the subject of dietary fitness, some of which has been generated by the Government in their dietary goals and guidelines.

In assessing the dietary guidelines, it's difficult to deal with a subject where there are more questions than answers. Controversy surrounds all of the issues—fat, sodium, sugar, cholesterol, and their role in causing or curing disease, and there is need for definitive answers.

For the same reasons, it's hard to argue with the dietary guidelines published by USDA and HEW this year. They represent a much-modulated version of the earlier McGovern Senate select committee goals which were of concern because they were an effort to formulate policy with insufficient evidence.

The early goals made a number of sensational claims linking consumption of certain foods to disease, and calling for reduced meat intake to prevent stroke and heart attack.

Perhaps it is a fine point to indicate that there is a difference between goals and guidelines, but I think in this case, goals represent a mandate, guidelines a recommendation or advice. The new Government guidelines for the most part eliminate discrimination against whole categories of food. They admit that the connection between food and disease is not defined and that more research is needed before claims can be made. They advise that the guides are for healthy people only and are not a guarantee against illness.

The "Dietary Guidelines" give such commonsense advice as—to eat a wide variety of foods, to maintain ideal weight by avoiding too much fat (not too much meat), to avoid taking in too much sugar, salt, alcohol. This is pretty basic stuff, a lesson in moderation.

The Oscar Mayer version of dietary guidelines—which represented the company position on the goals—was issued about 6 months earlier and the recommendations are very similar.

In fact, the Government guidelines may match current eating patterns more closely than is believed. A recent study of food intake shows that calorie intake in 1977 was lower than in 1965 (and is now 10 to 25 percent less than the Government recommended daily allowance—RDA). It also shows a decrease in protein, fat, and carbohydrate intake—fat by at least 20 percent for about half of the groups studied. For women it shows about 17 percent of the calorie intake in protein; 42 percent each in fat and carbohydrate.

Another point of special interest from this study is this: Half the population cannot get their nutrient needs without gaining weight. As a result the concentration of nutrients per calorie consumed becomes more important, and for protein more critical than for other nutrients because food supplements are calorie free, a safe and inexpensive way to get needed vitamins and minerals. There is no safe and easy way to obtain protein without eating protein foods.

The situation is this: Current studies show the average American woman is consuming only 1,520 calories per day, nearly 25 percent less than the 2,000 needed to get all nutrients. Yet this is not associated with a decline in weight.

The same intake study shows that women are consuming almost exactly the amount of protein recommended, which means that any further calorie reductions (to reduce weight) at the cost of protein foods would make it impossible to meet the daily protein need unless all of it comes from the best quality sources. More protein is needed for a lower quality source than for high quality source.¹ Consequently, if one needs less protein of high quality than of low quality, one also needs less volume of food and consequently fewer calories through high quality protein foods to meet the needs. It would be doing a favor to the female half of the population in trying to maintain ideal weight and still meet all nutrient needs. (Men seem not to be affected because they're bigger, but this should not cause one to underestimate the importance of such considerations inasmuch as women represent more than half the population.)

In reference to the earlier 1976 Senate select committee goals, these fostered some misconceptions about meat which are of grave concern to us. By advising Americans to eat less meat in order to reduce fat, saturated fat and cholesterol in the diet, the goals propagated the notions that (1) Americans are eating too much meat; and that (2) meat is loaded with fat and cholesterol. Following are some facts:

Per capita consumption of cooked meat, edible portion, is 218 ounces per day. This represents 25 percent of the total protein intake and supplies about 40 percent of the need.

Lean meat contains just 50 calories per ounce whereas fat contains 250 calories per ounce, indicating that one need not eat less meat to eat less fat. But one must understand differences among meat cuts and processed meat products and learn to identify the dietary differences among products in a category, and even in the same product from brand to brand.

All Oscar Mayer ham products, for example, contain 5 percent fat, a very low level for any protein food. It compares favorably with lean chicken or turkey or cottage cheese. The calorie content is just 30 per ounce, 120 in a 4-ounce serving. And this is pork.

It's commonly believed that animal fat is completely saturated. The fact is that beef fat contains more unsaturated than saturated fats, according to a new study on the nutrient values of beef just released by the Meat Board. (New studies will soon be done on pork, lamb, and veal as well.)

Findings from the same study indicate that the fat marbled in lean raw beef, after trimmable fat is removed, is just 6 percent for food grade, 8 percent for choice grade and 12 percent for prime grade. Even at a 12-percent level, the fat content of lean beef is less than half that in most kinds of cheese, and not much more than eggs at a 10-percent level.

Another little-known fact is that pork contains no more cholesterol than beef—and much less than eggs and most kinds of seafood.

¹ The RDA calls for a 20-gram higher intake of protein which is of a quality less than that in milk or meat.

The cholesterol content is very high in some foods that are very low in fat.

There are many widely held notions about meat which are false. Anyone who takes the time to study and compare various packaged protein foods using label information now in the supermarket finds that, feature for feature, processed meat stacks up very well. Per capita consumption of nonmeat protein foods is growing at a much faster rate, probably because of their perceived, not real dietary benefits.

Nutrition education is needed. Oscar Mayer is trying to do something about that. The public perception of meat, particularly processed meat, is much more negative than the product warrants. Only by disclosing the facts can the meat industry answer the criticism and correct some of the misconceptions. It is to our benefit to do so.

To respond to consumer concerns about diet and health, Oscar Mayer has developed over the last 2 years a three-part program which involves:

(1) *The development of a nationwide public information program to discuss the dietary goals and the role of meat in the diet as it relates to disease prevention.*

This included the development of a position paper on dietary fitness, called "Dietary Fitness—A Meat Lover's Guide," a slide show and other collateral materials which were disseminated through all channels of public information with emphasis on several target audiences—diet groups, fitness organizations, and health professionals, as well as the general public. In this literature extensive use was made of product comparisons to give consumers that all-important perspective or frame of reference.

(2) *Development of a nutrition policy pledging to produce nutritious products, provide information about those products, and encouraging consumers to take an active role in making their views known. This was adopted by the company's board of directors, who also called for implementation of this pledge through the establishment of a policy committee of vice presidents reporting to the CEO.*

The first item on the agenda has been an exploration of the sodium question and possible options for action. Although meats contain almost no sugar, and they can be very low in fat, calories and cholesterol, the two ingredients common to all sausage products are meat and salt. Sausage is named for the ingredient salt. The word sausage is derived from the Latin word "salsus" meaning "salted" meat. Levels in products are from 2 to 3 percent, about the same as cheese and cold cereals on an equal weight basis. But salt cannot be eliminated from processed meat without destroying the character, flavor, freshness, and keeping qualities of the product, or even reduced to the level that would be suitable for sodium-restricted diets. On the other hand, consumers know that processed meats are salted by their flavor. The presence of salt is not hidden, so the use of salt is not deceptive. The following comparison is intended to give perspective—not to be defensive: In a bacon, lettuce, and tomato sandwich, the two slices of bread contain more sodium than the two slices of bacon.

The sodium question is just one of the subjects to be studied by this policy committee. Copies of the policy and the company's position on the dietary goals are available by contacting Office of Consumer

Affairs, Oscar Mayer & Co., P.O. Box 7188-DC, Madison, Wis. 53707.

(3) *Development of a voluntary labeling program for nearly a dozen cold cuts which are 90 percent or more fat free.*

The company worked with the USDA for nearly a year to develop an acceptable format that would carry information useful to the millions of consumers concerned about diet as it relates to health. Content of the label was intended to reflect current concerns, including the potentially negative dietary factors.

The face of the package carries a sticker disclosing the fat-free content of the product, and is restricted only to those products which contain 10 percent or less fat. (A number of alternatives were considered and rejected before the fat-free statement was selected. The objective was to find a factual, meaningful and provable statement; not something subjective or misleading.)

The back of the package carries a panel of dietary information in a simplified format which includes disclosure of calories, protein, carbohydrate, and fat. Vitamin and mineral content were eliminated and replaced by cholesterol, sodium, and potassium values. All data is listed on a per slice basis. Data is expressed in numerical form without graphics in order to present facts without judgments and let consumers make up their own minds.

The information panel also includes a percentage breakdown of ingredients in the product, as consumed. Ingredients are listed by function and to the nearest 1 percent. This is additional to the listing of ingredients in descending order, which has been a labeling requirement of the USDA for many years.

In market testing the concept, overall interest in dietary factors was found to be high, and pretty closely matched FDA-USDA findings in their labeling hearings. Many consumers thought the product had been reformulated (they had not been) because they assumed that if there was something good to say about the product it would have appeared on labels long ago!

In market testing the labeling concept, Oscar Mayer learned that:

Expectations of coldcuts are so low that information surprised consumers and raised their perception of the products.

The fat-free statement had a positive effect on consumer opinion of the product.

Calories are the largest issue on the consumer mind, followed by interest in protein and fat (calorie content disclosure was one of the sticker alternatives rejected because calorie content varies with the size of slice, whereas the fat-free content is constant).

Vitamin and mineral information was not missed, although it prompted, consumers suggested listing these values.

In serving size considerations, although two slices is the most frequent size of serving (about one-third of the time for those surveyed) an overwhelming majority of consumers—more than 80 percent—preferred listing of the dietary factors on a single slice basis (rather than two slices or 3 ounces). It makes for easier calculations.

There was very high interest in percentage ingredient listing. Consumers showed a distinct preference for listing ingredients as consumed rather than as formulated. And consumers prefer com-

mon names for listing ingredients to chemical names (salt, sugar, vitamin C rather than sodium chloride, sucrose, ascorbic acid).

The sample label was almost universally accepted as having enough information to make purchase decisions, and the overall impact was so positive that the decision was made to apply the labeling concept to all qualifying coldcuts for national distribution. The newly labeled products have been in supermarkets since July, and response has been terrific.

Once consumers know about the program they really like it. Favorable comments have been received from individual consumers and opinion leaders in the diet, fitness, and health fields. Literature about the program is being used by hospitals, retailers, physicians, and weight control groups. The company received good media coverage for this cooperative effort with the Government, and best of all, sales are steadily increasing.

This is only the beginning of many programs which can be done in the broad area of dietary fitness.

To accomplish them, however, Oscar Mayer and the meat industry need help. There are some things the Government can do to make it easier to get out the facts about meat.

(1) Government can give support to processors and retailers who take initiative in developing nutrition education programs by permitting flexibility for each to tell his unique dietary story.

(2) The Government can set uniform standards for inspecting and labeling all food products. Uniform labeling standards would eliminate discrepancies between meats and nonmeats and allow comparisons of one protein food to another. Uniform labeling standards would also give incentives to the leaders by requiring those who follow the leader to meet the same stringent criteria. (Oscar Mayer, for example, has requested that the Government restrict approvals for fat-free labeling to products containing 10 percent or less fat, and that disclosure of other dietary factors be compulsive if fat-free labeling is used.)

Currently the jurisdiction over food products is shared by three separate Federal agencies, all with different standards—fish by Commerce, meat and poultry by the USDA. All other food products are under FDA jurisdiction. The USDA provides for a number of controls not present in the FDA system, including:

Continuous resident inspection at all times any plant is in operation;

Advance approval on every label used, with specific information requirements;

Advance approval on plant construction and facilities;

Maintenance of inspection procedures and standards for foreign products to equal Federal inspection programs.

(3) The Government can separate production from consumption figures in USDA statistical reporting. They are not the same. USDA production figures for red meat are widely quoted as consumption figures and they vastly overstate actual edible portion consumed because they represent carcass weight which includes bone, fat, and waste that are not eaten. Actual consumption of red meat edible portion, is less than 3 ounces per day, or 100 pounds per year—half of the

200 pounds of production, but a realistic figure. The USDA is doing consumers and the meat industry a disservice by propagating inflated meat consumption figures which seem to indicate Americans are eating too much meat.

(4) Government can give consideration to disclosure of protein quality as well as quantity in food labeling for the reasons mentioned earlier. The concentration of nutrients per calorie consumed becomes more important as calorie intakes for people decline to levels below those needed to obtain all nutrients.

If the Government would do some of these things—

Give support to voluntary industry programs;

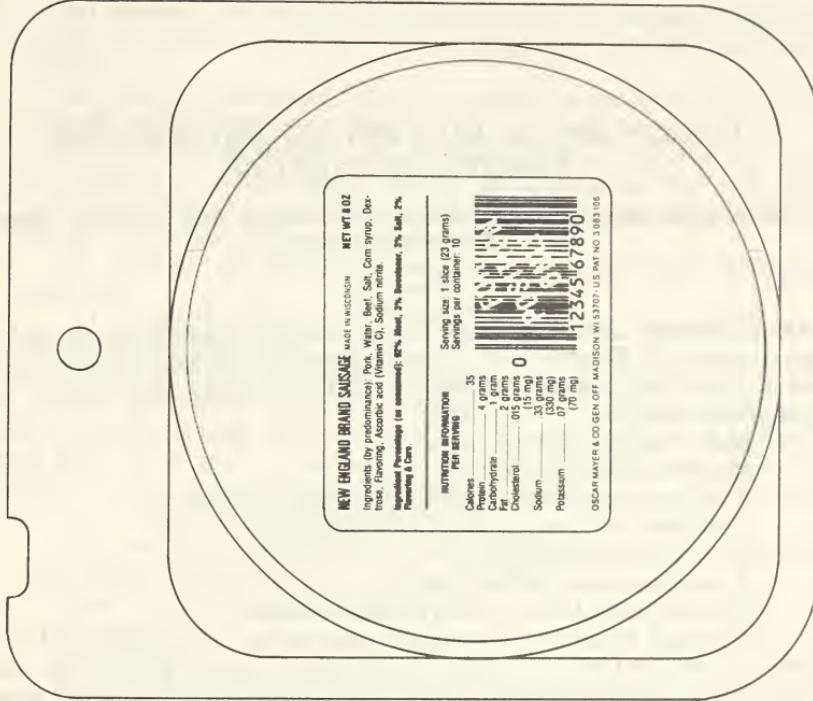
Establish uniform standards in inspecting and labeling all food products;

Separate red meat consumption figures from production figures in USDA statistical reporting to give a more realistic and less inflated view of meat intake;

Consider protein quality as well as quantity in labeling regulations.

These Government actions would help the meat industry tell its story in a nondistorted way and do a better job of responding to dietary issues in the marketplace.

SAMPLE LABEL; 90% FAT-FREE COLD CUTS



INTERPRETING DIETARY GUIDELINES FOR VARIOUS AUDIENCES

(By Guendoline Brown, Department of Food Science and Nutrition, Colorado State University)

In February 1980, the U.S. Department of Agriculture and the Department of Health and Human Services (formerly HEW) released their long-awaited "Dietary Guidelines for Americans." The seven guidelines:

- Eat a variety of foods;
- Maintain ideal weight;
- Avoid too much fat, saturated fat, and cholesterol;
- Eat foods with adequate starch and fiber;
- Avoid too much sugar;
- Avoid too much sodium; and
- If you drink alcohol, do so in moderation;

are elaborated upon in a 20-page pamphlet, "Nutrition and Your Health; Dietary Guidelines for Americans," which focuses on qualitative dietary considerations rather than quantitative nutrient recommendations. The guidelines, which are directed toward helping Americans make prudent dietary decisions, have elicited much interest, discussion, and controversy. However, they provide an excellent base for the development of educational materials with wellness objectives.

Other recent notable attempts to assess food and diet quality are (1) the two editions of "Dietary Goals" developed by the Senate Select Committee on Nutrition and Human Needs in 1977, (2) the Surgeon General's Report, "Healthy People," published in 1979 by the Department of Health and Human Services (formerly HEW), (3) "Food," the new food guide developed by USDA in 1979, and (4) "Toward Healthful Diets," published in 1980 by the Food and Nutrition Board of the National Academy of Sciences. All of these publications may be loosely grouped together under the general umbrella of "food selection guidelines" with the common goal of helping consumers make intelligent food choices.

The "Dietary Goals" developed by the Senate Select Committee on Nutrition and Human Needs was the first comprehensive statement by any branch of the Federal Government on risk factors in the American diet. The goals are:

- (1) To avoid overweight, consume only as much energy (calories) as is expended; if overweight, decrease energy intake and increase energy expenditure.
- (2) Increase the consumption of complex carbohydrates and "naturally occurring" sugars from about 28 percent of energy intake to about 48 percent of energy intake.

(3) Reduce the consumption of refined and processed sugars by about 45 percent to account for about 10 percent of total energy intake.

(4) Reduce saturated fat consumption to account for about 10 percent of total energy intake.

(5) Reduce saturated fat consumption to account for about 10 percent of total energy intake; and balance that with polyunsaturated and monounsaturated fats, which should account for about 10 percent of energy intake each.

(6) Reduce cholesterol consumption to about 300 milligrams per day.

(7) Limit the intake of sodium by reducing the intake of salt to about 5 grams a day.

The Surgeon General's report, "Healthy People," published in 1979, stated that individual nutrition requirement variations make exact dietary standards impossible to establish. However, the report further stated that given what is already known or strongly suspected about the relationship between diet and disease, Americans would probably be healthier, as a whole, if they consumed:

Only sufficient calories to meet body needs and maintain desirable weight (fewer calories if overweight);

Less saturated fat and cholesterol;

Less salt;

Less sugar;

Relatively more complex carbohydrates such as whole grains, cereals, fruits and vegetables;

Relatively more fish, poultry, legumes (for example, beans, peas, peanuts), and less red meat.

The document said the major objective of nutrition education should be to teach skills that can be used to improve dietary habits rather than merely provide information on the nutrient content of foods.

The 1979 version of the USDA food guide called "Food" divided foods into five main groups on the basis of their similarity in nutrient composition. These are the (1) vegetable and fruit group; (2) bread and cereal group; (3) milk and cheese group; (4) meat, poultry, fish, and beans group; and (5) fats, sweets, and alcohol group. This publication is supported by a brochure entitled "The Hassle-Free Guide to a Better Diet," which pictorially illustrates the food groups and indicates the recommended number and size of servings to be consumed daily from each group. Thus, "Food: The Hassle-Free Guide to a Better Diet" may be used by nutrition educators to assist people in planning adequate diets that will meet the recommended dietary allowances set by the Food and Nutrition Board of the National Academy of Sciences. The recommended dietary allowances are met by selecting servings of food from each of the food groups, rather than by calculating amounts of nutrients needed.

Rearrangement of the order in which the food groups appear pictorially, and the recognition of a fifth food group that includes foods low in nutrient density and high in fat, sugar, or alcohol are the major differences between the 1979 version of the USDA food guide and the well-known "Basic Four Food Groups" version used previously. Due to the high caloric content and low nutrient value of foods in the fifth group, they may generally be regarded as nutrient dilution factors in

the diet. That is, these food items reduce the diet's nutrient/energy ratio. Individuals whose calorie needs are least should, therefore, limit their intake of food from this category. The key to food guides is the information they provide about the number and sizes of servings recommended daily from among the different food groups that will meet the major nutrient requirements of given population groups.

In "Toward Healthful Diets" the Food and Nutrition Board of the National Academy of Sciences made the following recommendations to adult Americans.

Select a nutritionally adequate diet from the foods available, by consuming each day appropriate servings of dairy products, meats or legumes, vegetables and fruits, and cereal and breads.

Select as wide a variety of foods in each of the major food groups as is practical in order to ensure a high probability of consuming adequate quantities of all essential nutrients.

Adjust dietary energy intake and energy expenditure so as to maintain appropriate weight for height; if overweight, achieve appropriate weight reduction by decreasing total food and fat intake and by increasing physical activity.

If the requirement for energy is low (for example, reducing diet) reduce consumption of foods such as alcohol, sugars, fats, and oils, which provide calories but few other essential nutrients.

Use salt in moderation; adequate but safe intakes are considered to range between 3 and 8 grams of sodium chloride daily.

While there are basic differences among the "Dietary Guidelines for Americans," "Dietary Goals," "Healthy People," "Food," and "Toward Healthful Diets," they are all directed toward the establishment of a national nutrition policy. Data available to support each of these food selection guidelines are incomplete; as they may well always be. Surely, though, if there is ever going to be anything that we as nutrition educators can take a stand on together, it is on their general overall appropriateness. Food selection guidelines alone cannot serve as a national nutrition policy, however. As stated in February 1980, in the National Consortium's position paper on a national nutrition policy:

We need strong nutrition education programs which are scientifically based, forthright with response to controversy and well formulated in order to keep the public informed about the current state of knowledge with respect to diet and the prevention of disease.

Nutrition education, therefore, becomes an inherent part of attaining the goals of a national nutrition policy.

Nutrition education will continue to be challenging in the 1980's. Traditional teaching methods will have to be supported by innovative and cost effective techniques. Programs must be specifically designed to meet the needs and expectations of consumers. Messages must be carefully targeted to specific groups and must meet the informational needs felt by these target groups. Careful consideration must be given to existing dietary patterns and eating habits. Recommendations for dietary changes must be moderate; if they are too severe they will be ignored. Cultural and ethnic backgrounds, literacy levels and motivational levels of the target group must also be given serious consideration in the designing of effective nutrition education programs. Information must be interpreted in such a way that the audience being addressed identifies with that information and knows that the message is meant specifically for them.

In an effort to reach two diverse audiences with basically the same nutrition message, we at Colorado State University have attempted to develop two, equally effective, audiovisual learning modules based on the "Dietary Guidelines." The message is informational, with the objective of providing sound recommendations for dietary change, if an individual identifies a need for such change and desires to meet that need. The audiences, however, toward which the message is targeted, are quite different. One of the modules is designed for use in beginning level college nutrition classes, while the other was developed with funding provided by the Colorado Migrant Council for use in nutrition education programs for migrant farmworkers in Colorado. The challenge is to effectively meet the educational needs of both groups.

Language differences and differences in literacy levels were, of course, given consideration in developing the learning modules. However, it also was necessary to consider sociodemographic differences, cultural differences, differences in dietary patterns, and difference in income levels of the groups to be addressed.

The amount of emphasis placed upon a specific guideline differed between the groups. The limited variety in the diet of the migrant farmworker caused us to focus on the first guideline, "Eat a variety of foods." Likewise the typical high-fat, high-sugar, high-alcohol diets of many young college students provided excellent examples of low-nutrient-density diets resulting from the nutrient dilution caused by the fat, sugar and alcohol. Excellent opportunities to focus on those guidelines which may easily be tied to a nutrient density approach to dietary recommendations (for example, guidelines 3, 5, and 7) were therefore provided.

Other examples of targeting a specific guideline to a specified audience might be guideline 2, "Maintain ideal weight" for a weight reduction program, or guideline 6, "Avoid too much sodium" for individuals who are particularly concerned about their level of salt intake. It is most important that we, as educators, realize that there is room for flexibility in the use of the "Dietary Guidelines." There is no necessity that each of the seven guidelines be given equal emphasis whenever they are used in educational programs, nor is it necessary that all the guidelines are addressed in every program. It is far more important that the needs of the audience are identified and that programs are designed to address these needs.

MICHIGAN BASIC NUTRITION FACTS: DEVELOPMENT AND IMPLEMENTATION

(By Molly A. Gruber, R.D., M.S., Chief Nutritionist, Bureau of Personal Health Services, Michigan Department of Public Health)

Nutrition as it relates to health has become a popular issue. Individuals are presented with nutrition and dietary advice through all means of communications including TV, radio, books, magazines, and newspapers. Controversies related to interpretation of scientific nutrition findings, environmental impacts of food consumption and the economic effects of food confuse the consumer and fragment the professional nutrition community.

Professional judgments for nutrition education and intervention differ among health professionals. Variant and sometimes conflicting nutrition information may be provided by health professionals and nutrition educators. Consumer interest, expanding scientific information and a desire to provide consistent quality nutrition services to Michigan citizens prompted the formation of a Nutrition Facts Task Force in November 1978.

DEVELOPMENT OF THE TASK FORCE

Michigan is endowed with many concerned organizations, associations and agencies related to continuing professional education, health care delivery, consumer education, and consumer advocacy. The State also has many public and private colleges and universities which prepare health professionals. The professional and consumer communities in the State have a desire to work together to solve problems and improve the health and nutritional well-being of the population.

In July 1978 Governor Milliken signed the public health code into law. P.A. 368 of 1978 mandates that the Michigan Department of Public Health and all local health departments plan and implement nutrition services. Additionally, the State health coordinating council, the statewide nutrition commission and the interagency committee on nutrition identified statewide priorities related to nutrition status, food availability and coordinated educational programs.

The Michigan Department of Public Health invited 46 public and private health and nutrition organizations, associations, institutions and agencies to assist in developing a nutrition information and services system which would meet part of the planning mandates to improve the health and nutritional status, and have a more informed and nutritionally aware population. The task force was convened to develop a consensus of opinion as to the nutrition principles for health promotion and disease prevention. Organizational representatives of health disciplines and consumer advocates interested in nutrition were

asked to share their expertise in order to develop and disseminate statewide nutrition guidelines. The expected outcomes of the nutrition facts task force originally were:

1. Development of guidelines for nutritional management of heart disease, diabetes, cancer, and malnutrition.
2. Establishment of norms for identifying individuals needing nutrition intervention through screening and diagnosis of selected diseases/conditions.
3. Development of guidelines for basic preventive nutrition.
4. Development of education programs and activities appropriate for the general public to provide correct nutrition facts about normal nutrition, health promotion and nutritional management of selected diseases/conditions.
5. Dissemination of nutrition facts developed by the task force to professionals and consumers throughout the State.

The first meeting of the task force was attended by 50 persons outside of the Department representing 33 organizations. It was proposed that five workgroups would be formed and that the entire task force would give consideration to standards for nutrient intake, body composition (obesity, leanness), and biochemical nutrition status parameters. Four workgroups were envisioned to develop basic nutrition facts working from the nutritional management of disease to prevention. The fifth group would develop effective strategies to provide information and education to professionals and to specific age, sex and ethnic components of the population. The workgroups focusing on disease-centered issues (cancer, diabetes, heart disease) felt that current knowledge was too limited to develop a prevention aspect to these specific diseases and that available resources would not allow completion of the objectives within a year. Based on a general consensus, three revised objectives were prepared for the nutrition facts task force over the year. The task force members agreed to:

1. Develop statements of basic nutrition facts which are important for the promotion and protection of health.
2. Assist in disseminating established nutrition facts to health professionals throughout Michigan to be used as a standardized resource for nutrition information and education.
3. Develop effective techniques for communicating nutrition facts based on available resources.

Minutes of the organizational meeting in 1978, including the revised objectives, were shared with all invited groups. Each organization was asked to participate (through representatives) in one or more of the following ways: define facts to be addressed (one meeting), develop and reference facts, identify and implement education strategies, serve as a mail reviewer, or have no involvement. Over the year, additional groups and individuals were added to the task force in a reviewing capacity. Forty-five of the original 46 continued to participate in the basic facts task force.

DEVELOPMENT OF BASIC FACTS

Major areas were identified for fact development at the organizational meeting of the nutrition facts task force. These included: (1) need and utilization of specific nutrients and energy balance; (2)

evaluation of food intake and nutrition status; (3) effects of excess and inadequate intake on health; (4) factors interfering with nutrient intake and utilization; (5) food sources of nutrients; and (6) guidance for food selection. Specific concerns related to the life-cycle were addressed for each area. The second meeting of the task force was held in January 1979 to further identify the areas for fact development. Issues raised in the dietary goals of the Senate Select Committee on Nutrition and Human Needs had to be addressed.

The task force was split into three groups. The writing and documentation of the basic facts was made the responsibility of the nutrition/health promotion workgroup. It was responsible for compiling factual material for dissemination. The nutrition education and communication workgroup was formed to develop strategies for communicating basic facts. They established goals for communicating basic facts. At least two formats would be developed—one for consumers and one for professionals.

The workgroups had volunteer chairpersons who were responsible for facilitating the group process and sharing information with each other. The nutrition/health promotion workgroup met 9 times. The nutrition education/communications workgroup met on 6 occasions. Minutes and drafts were shared between these workgroups. Mail reviewers received each draft.

Fiscal resources from the Michigan Department of Public Health were limited to communication costs for task force operations and staff time of department personnel involved in the effort. In order to minimize individual cost, the full task force met only twice in order to finalize goals, set objectives, and establish major issues and standards to be addressed in the basic facts.

THE PROCESS OF WRITING THE DOCUMENT

The operating premise of the task force was that the document would have the consensus of all members. In order to initiate this process, we recognized that the major working assumptions for the document would be a standard for nutrient intake and a standard for appropriate body weight.

The chairman of the food and nutrition board conducted a mini-seminar on the recommended dietary allowances (RDA). The task force recognized the necessity of adoption of the RDA even though several members personally did not agree with all conclusions reached by the food and nutrition board. The RDA became the working base. The 8th edition text and the 1979 tables were used in concept formation. When the 1980 edition became available, it was reviewed and served as the final reference for nutrient levels.

The other major premise was the definition of obesity and the role body weight and fatness had in health. Based on data presented by a fellow from the University of Michigan, Center for Growth and Human Development, and literature review, we recommend definitions for obesity and leanness based on skin-fold values. Since these measures are not yet widely used in practice, health and nutrition examination survey (HANES) weight-for-height data were used for adults and the National Center for Health Statistics (NCHS) charts were used for infants and children.

As members of the writing committee developed various chapters of the text, omissions in concept linkages became evident. Additions and deletions occurred in each draft under review. Representatives of several associations shared drafts with their board of directors. This broader initial review process made significant contributions to the document. For example, a major concern expressed by the Michigan Food and Nutrition Coalition Board was the brief mention of vegetarianism and a lack of dietary guidance for vegans. Based on the concerns of this consumer advocacy group, vegetarianism became a chapter in the issues section. Professional judgments agreed that insufficient data (including nutritional values of food) was available to develop a vegan dietary pattern. Individualized family guidance was recommended in order to account for varied dietary habits and food items consumed.

In addition to review and comment within Michigan, we shared drafts with staff of the Human Nutrition Center, USDA. The history and present status of dietary guidance development in USDA was helpful as we analyzed previous eating guides and formulated decisions for the Michigan material.

In order to present widely accepted factual material and still be responsive to the nutrition issues and concerns facing consumers and professionals a format was designed. Widely accepted facts were printed in regular type and information representing less conclusive scientific opinion was presented in italic print. Nutrition issues which had implications for particular dietary practices had dietary recommendations developed as boxed sections.

Dietary recommendations were the priority of most organizations. Considerable effort was spent developing a food guide for the population that addressed RDA level nutrients. Dietary recommendations were also developed for issues such as weight control, weight loss, fat intake, sugar consumption, and sodium intake.

The most difficult and controversial area in developing the recommendations involved the eating guide for children and adults. Many members of the task force felt that the population's energy needs were probably lower than usually recommended. These impressions were supported by mean energy intakes of adults found in the HANES survey. Recognizing that most people would want some nonessential but energy-yielding food items in their diet, the decision was made to formulate a guide based on 1,500 kilocalories which could provide RDA levels of nutrients in an economical manner. Starting with the USDA "Daily Food Guide," menus were developed using minimum servings and portion sizes and computer analyzed for 22 nutrients.

These menus met protein, riboflavin, niacin, and calcium levels but fell below RDA levels for vitamins A, B₆, and folacin and the minerals zinc, magnesium, and iron. The weekly averages most substantially below RDA levels were vitamin B₆ at 55 percent, folacin at 61 percent, zinc at 67 percent, and iron at 71 percent.

As we worked to develop a more suitable pattern, food items contributing difficult to obtain nutrients were evaluated. For example, use of whole grain breads enhanced magnesium intake. Ready-to-eat cereals provided more iron than typical whole grain cereals. Several ready-to-eat cereals are fortified with magnesium, zinc, and vitamin B₆ and folacin. Use of one or two servings of these fortified foods

significantly improved the nutrient density of menus under 2,000 kilocalories. Iron and zinc intake was substantially lower when red meat was not used. Five or six ounces of meat or other protein source increased trace nutrient levels. Based on a 1,500 kilocalorie target which kept fat at or below 35 percent of calories and protein below 15 percent of calories, the contribution of particular types of food became more significant. The final eating recommendations for children and adults were 5 servings of vegetables-fruits, 5 servings of bread-cereals, 2 to 4 servings of milk-cheese, and 2 servings of meat-poultry-fish-beans. Specific food choices were recommended under the vegetable fruit group such as daily serving of raw fruit or vegetable, daily dark green leafy vegetable, daily fruit(s) or vegetable(s) which supplies at least 30 milligrams of vitamin C and 2,500 IU vitamin A, and the bread-cereal group should contain some whole grains and some enriched/fortified products.

BASIC NUTRITION FACTS IMPLEMENTATION

The philosophy behind the "Basic Nutrition Facts," to provide consistent information and quality nutrition services, has been implemented on several levels prior to the availability of the actual document. Nutrition linkage efforts have been strengthened and several others initiated through the nutrition facts task force.

The cost-sharing (State and local) component of the State's public health code provide fiscal support for delivering nutrition services at the local level. Minimum elements used to describe nutrition services include nutrition screening and nutrition education and nutrition assessment, education and counseling. The definitions of these service components (nutrition screening, nutrition risk, nutrition assessment, nutrition education and counseling) are detailed in "Basic Nutrition Facts" and serve as the core standard for the delivery of public health nutrition services.

The Michigan Dietetic Association's Quality Assurance Committee has adopted portions of "Basic Nutrition Facts" in the development of standards for hospitalized patients (now being field tested) and in the preparation of ambulatory nutrition standards.

The statewide health coordinating council utilized drafts of basic facts in developing the nutrition goal and objectives for the federally mandated State health plan. The nutrition goal and objectives are listed below:

Goal A7.—All residents of Michigan shall be insured access to food and nutrition resources, information, and services that promote optimal nutritional health for the individual.

Objective.—The nutritional status should be improved among the entire population in both caloric intake and nutritive value such that there is an increase in the proportion of the population whose dietary intake meets the recommended dietary allowances as identified by:

- a. a reduction in the incidence of low weight births (less than 2,500 grams) to 65 per 1,000 live births;
- b. a decrease in the incidence of iron deficiency anemia among pregnant and lactating women, infants, children, and the elderly to 5 percent;

c. a reduction in the proportion of the population who exceed or fall short of the standards set for acceptable skinfold thickness or weight for height as stated in "Basic Nutrition Facts in Michigan."

Utilization of the "Basic Nutrition Facts" in the main objective is expanded in proposed Policy A7-3 and recommended action A7-3.8.

Proposed policy A7-3.—By 1984, a coordinated, consolidated system to provide accurate and standardized consumer food and nutrition information to Michigan residents should be developed and implemented.

A7-3.8.—To assure the availability and consistency of consumer information about dietary goals, food safety, drug-food interaction, food preparation and preservation, budgeting and food purchasing options, vegetarian's diets and meal preparation, the following steps should occur:

a. all consumer information services administered by the State should incorporate the "Basic Nutrition Facts of Michigan" into program planning and material. The "Facts" should be revised and updated as necessary by the Michigan Department of Public Health.

b. the "Facts" should be developed into brief factsheets, easily read and understood, in English and other commonly used languages and distributed through resources to consumers.

c. the establishment of consumer access to a cooperative extension service's toll free hotline.

Another of the proposed policies (A7-6) addresses quality food and nutrition services in public and private institutions and alternative care facilities. One of the recommended actions relates to development of uniform guidelines for all aspects of food service. Eight State agencies are involved in either the development and implementation of regulations or the provision of technical consultation and training for food service operations. This group has endorsed the Basic Nutrition Facts and these facts have become the basis for the development of proposed State rules and guidelines.

An immediate effect of the task force communications workgroup was the recommendation to develop educational material for select population groups. Parents and caretakers of preschool children were selected for that audience. An interagency committee composed of representatives from Cooperative Extension Service (family living education and food service management), Department of Education (child care meals and nutrition education and training) and Department of Public Health (women, infant, and children supplemental feeding program and early, periodic, screening, diagnosis and training program) have been meeting since February 1980 to develop a preschool feeding reference booklet and parent materials. These interagency materials will be jointly published and available statewide to day care centers, child care homes and other human service providers for use with preschool children and parents. The dietary recommendations from Basic Nutrition Facts will be incorporated and expanded to meet specific dietary needs of the preschooler.

Prenatal, infant, and general population nutrition information materials distributed by the Michigan Department of Public Health have been revised to present a brief section of Basic Nutrition Facts appro-

priate to the lifecycle concerns of consumers. These are written at the sixth to ninth grade reading level. "Infant Feeding Guides for Breast-fed and Bottle-fed Infants" are available in English, with the Spanish translation anticipated in December; English and Spanish versions of "Food While You're Pregnant" and "Ironing Out Your Diet" are also anticipated in December. These nutrition information materials are widely used in State and local public and private health care services and nutrition education programs.

A key phase of implementing Basic Nutrition Facts is reaching health professionals and nutrition educators across the State. A situation that needs immediate attention is nutrition education in Michigan schools. The 1979-80 Michigan education assessment program (MEAP) showed that children are not receiving sufficient nutrition education to make sound nutrition decisions. Student attainment scores in nutrition were the lowest of the 10 health skill areas tested. Many of the objectives not achieved by students are critical to the development of nutritionally sound eating habits that promote and maintain the quality of life. Basic facts provide the vehicle for informing teachers about nutrition facts which they should include in their classroom learning experiences. To support Michigan efforts, it is essential that NET funding is returned to original funding levels.

The facts must be understood and incorporated into the delivery of nutrition services. The current State level effort involves reaching practitioners and educators through their respective organizations. A series of news releases and continuing education programs are underway. State agencies are planning and conducting programs for their local colleagues. Regional seminars across the State are being coordinated through the nine district dietetic associations. Nutrition educators are sharing the facts with the consumers they serve.

This phase has just begun and will be a continual process as revisions with updated facts, issues and dietary recommendations emerge.

OUTLOOK FOR THE 1980's

The Michigan nutrition community recognizes the need to work together in providing nutrition information, food support programs and nutrition services. Nutrition program personnel, health professionals, other human services providers and consumer advocates have come to appreciate the contributions that each has to offer toward the goal of a well-nourished population. Through mutual cooperation, we have grown in understanding and trust. With diminishing available resources, it is crucial that our common cause unite and channel efforts for planned, cooperative and coordinated food and nutrition programs and services. As Michigan recovers from its economic depression, food and nutrition services that are designed to meet the needs of all segments of the population must become a reality. As funding becomes more competitive, we must show benefits for services. The immediate cost-benefits of education and other prevention activities are difficult to evaluate in today's society, yet Government must be responsive to all citizen needs. The decade of the eighties offers the challenge of skillful balancing of resources for prevention while maintaining nutrition care services in treatment and rehabilitation programs.

THE DIETARY GUIDELINES IN THE COMMUNITY: ONE PERSPECTIVE

(By Janet B. Schwartz, Nutrition Coordinator, Massachusetts Department of Public Health)

Being asked to talk on implementing the Dietary Guidelines is indeed a privilege. In some ways, it is like being asked to take care of the baby after someone else has gone through pregnancy, and survived labor and delivery. It is very clear that a great deal of time, effort and painstaking negotiations went into the development of the Guidelines. Although the birth was a bit more traumatic than originally anticipated, I am happy to report that the Dietary Guidelines have survived. In two months, they will be a year old.

To celebrate this occasion and to look forward to 1981, I would like to review what I have observed happening in our communities as a result of "Diet and Your Health"¹ and indicate where I see potential for utilizing the Guidelines.

There are as many definitions of the term "community" as there are sociologists. Communities are composed of myriad social and organizational networks. A list of organizations and enterprises which are directly or indirectly related to food or nutrition appears as attachment 1. The State agencies in the first part of the list illustrate the finding conduit for a vast number of community-based services. These services vary and include health, feeding, agricultural and educational programs. Other groups included range from religious organizations that sponsor emergency food programs to private enterprises which either sell food or assist consumers with their health and nutrition needs. This comprehensive list illustrates the pervasiveness of food and nutrition services on the community level and the diversity of groups which can utilize the Dietary Guidelines. The following review will provide a series of examples on how the Dietary Guidelines are being implemented in communities.

In the five years preceding the Guidelines, good nutrition has become a key word among groups involved in health care and concerned about the effects of dietary behavior on the progression and amelioration of medical conditions. It was not until the publication of "Diet and Your Health" and the Surgeon General's Report, however, that people concerned about preventive medicine were able to give the term "good nutrition" a definition. Currently, health centers, health maintenance organizations and even some private health care providers have begun education and counseling programs around the ideas put forth in the Guidelines.

Education of health care providers on the possibilities of improving health through changes in nutritional intake is an important, albeit

¹ "Diet and Your Health" should read "Nutrition and Your Health" throughout this paper.

slow, process that has just begun. I have already been approached by a group wanting to use the Guidelines as the basis for a curriculum they were developing for medical students.

In the education of students, the Guidelines have been used in many different ways. In the classroom, creative educators have been able to take the seven concepts and transform them into activities in which the children become aware of the choices they make regarding their personal dietary intake. Some schools have incorporated the Dietary Guidelines into their curriculum and others have initiated weight control programs for children and teenagers. Since the publication of "Diet and Your Health," the relationship between diet and health has become an accepted part in many health and science curriculums. Information about food composition has extended beyond protein, vitamins and minerals and includes fast carbohydrates, fiber, sugar, and salt. The progressive addition of these topics into the curriculum in schools will hopefully lead to a more knowledgeable and nutritionally aware public.

Compared to other methods and topics used to encourage teachers to indicate nutrition in the classroom, the guidelines work the best since their relevancy is apparent. Instructors who train teachers have incorporated the concepts into the material presented in workshops to open up discussion on the relationship among diet, health, and agriculture.

Most importantly, however, we have begun to see changes in the school food service. Although mandatory changes in the quality of the meals is not yet a reality, voluntary changes are apparent in the communities. Recipes are being altered to lower fat, sugar, and salt content. Salt shakers are being removed from tables. Fresh fruit is being served for dessert. Salad bars have been installed. Low fat alternatives, like yogurt and skim milk, are being offered. Freshly baked muffins and whole grain breads are being served as part of the school feeding program, and real fruit juices are sold. Parents, teachers, students, school food-service personnel and administrators are working together to bring about these changes as a commitment to making schools a place where students learn good nutrition by experiencing it. I have seen parent groups appeal to local school boards in support of the cafeteria's budget so healthier meals could be served. Public health nutritionists, local doctors and dentists give the parents technical assistance by using the "Diet and Your Health" as a framework.

The "Dietary Guidelines" are also used to assist consumers in making food choices. Cooperative extension agents have incorporated these ideas into their activities. Homemaker groups sponsor programs exploring the guidelines and I have even seen baking contests for whole grain, high fiber breads. Some agents are working cooperatively with retail food stores to educate consumers at the point of purchase.

One Massachusetts food store chain has initiated a labeling program in the stores where foods without any added fat, cholesterol, salt, and sugar are flagged on the unit pricing label. This project was inspired by the publication of "Diet and Your Health."

Another relatively new place where I have seen the "Dietary Guidelines" in action is in industry. To help cope with daily stresses of the

work place, many businesses have introduced physical fitness programs. Often these programs are initiated in conjunction with changes in the company's cafeteria. Alternatives to high fat, high salt noon-time meals have appeared in cafeterias at the workers' request. Vending machines at the work place have been changed to offer snacks and drinks which are low in sugar, fat, and salt.

To credit all of these initiatives to the "Dietary Guidelines" would be presumptuous. But, although these activities may or may not be a direct result of "Diet and Your Health," it is fair to say that the publication of the guidelines by the U.S. Department of Agriculture and Health and Human Services fostered the proliferation of new ideas and projects. In many ways, the ideas put forth in "Diet and Your Health" legitimized the claims being made about diet's relationship to health and gave consumers, public agencies, and private enterprises a direction toward which to focus their efforts to change dietary habits.

These initiatives represent the application of time and resources on the part of many people. Many more population groups and locations, however, can utilize the guidelines in their programs and services. The approaches are limitless given a creative mind and commitment to a healthy diet.

As this is an Agricultural Outlook Conference, it is appropriate to speculate on where the "Dietary Guidelines" can be most useful at the community level. It has been forecasted that, in the years ahead, food prices will continue to rise and feeding families on an increasingly tighter budget will present the major barrier to good nutrition. In our cities, we are beginning to see the effects of higher food costs with increasing numbers of people relying on food banks or emergency food donations. In rural and urban communities, we see people relying on supplemental food programs for their total sustenance. At the same time, the number of people being served by food programs will decrease due to rising costs and stabilized funding levels. If families and participants of food programs are to be able to maintain a balance between higher food costs and a nutritious diet over the next few years, then a change in nutritional intake must take place. The "Dietary Guidelines" can provide the basis for this change. Eating according to the guidelines offers consumers and food program sponsors the opportunity to have a low-cost, healthful diet. The increased reliance on complex carbohydrates suggested by the guidelines can give consumers a low-cost yet nutritious source of calories, protein, fiber, and micronutrients. The suggestion to increase consumption of fruits and vegetables is a realistic guideline given the upsurge in the number of home gardens and home canning activities. The guideline to cut down on fat, refined carbohydrates, and salt suggest that people reduce their purchase of highly processed, low nutrient-dense foods. As these items are among the most expensive foods on the supermarket shelves, this change in buying can make a significant impact on the food budget.

I suggest that during the upcoming years education programs based on the "Dietary Guidelines" be developed to assist people of all economic brackets and administrators of all types of food programs in controlling their food budgets.

It is fitting for the U.S. Department of Agriculture to take the lead in promoting the guidelines as a way to cut food costs since it is the U.S. Department of Agriculture's mission to provide an affordable food supply to the American public. U.S. Department of Agriculture through its Extension Service has had a long history of helping consumers with food budgeting. One of the expanded food and nutrition education program's major objectives is to help low-income people balance their food budgets. Extension agents spend much time promoting cost-saving suggestions for consumers. In addition, the dollar commitment to food programs in the U.S. Department of Agriculture is certainly significant. Developing cost-saving mechanisms would certainly be welcome by administrators, program directors, and food service managers.

Many people in the farm community are opposed to the "Dietary Guidelines" because they fear the economic changes that might take place if people become more conscious of the relationship between diet and health. Many scientists also reject the guidelines because they demand absolute proof that individual food components threaten the health of all Americans. To these people, I would like to address my last comments.

The food system is very complex and the most productive in the world. It has developed in this manner because of the hard work of many and the economic gains it brings to some. It has served most of the consumers in our communities very well. In the coming years, however, energy, production and marketing costs will increase and the food system will undergo many changes. Consumers and some farmers are already feeling the need for change and are justifiably frustrated with the rising cost of food. The issues involved in providing an affordable and healthly food supply which reaps economic gains for the farmers in this land are complicated but they cannot be ignored. We need to ask some tough questions and develop strategies to accomplish our common goal. Most importantly, we need to address these issues together. Consumers who want a healthy food supply must learn to deal with the economics of food production and marketing. Farmers, processors, wholesalers, and retailers must learn to respect the consumers' right to a healthy diet. Without this mutual understanding and concerted effort, we will expend our energies fighting each other instead of dealing with the issues at hand. The consumers in the Northeast, whom I represent, have as much at stake as the farmers in the Midwest. As a public health nutritionist, I look forward to working with all sectors of the food system to provide a healthy diet to all Americans. I encourage you to join with me in using the "Dietary Guidelines" as a framework on which to build our strategies.

ATTACHMENT 1 : FOOD AND NUTRITION SERVICES IN MASSACHUSETTS

Public—Federal Government services

HEW : Regional Offices, Headstart, Food and Drug Administration, and Rural Health Initiatives.

USDA : Regional Office.

CSA : Community Food and Nutrition Programs.

Public—State Government services

Department of Public Health :

WIC—Women, Infants and Children Program.

MIC—Maternal, and Infant Care.

Handicapped Children.

Hypertension Program.

Nutrition.

Food Safety Labeling.

Long Term Care : Nursing Homes and Pediatric Homes.

Public Health Hospitals.

Alcoholic Halfway Houses.

Alcoholic Treatment Centers.

School Health Exam.

Office of State Health Planning.

Department of Public Welfare: EPSDT—Early and Periodic Screening Diagnosis and Treatment Program; Community Health Centers, and Food Stamps.

Department of Elder Affairs: Congregate Meals (Title IIIC), and Homemaker Services.

Department of Education : School Lunch ; School Breakfast ; Child Care Feeding ; Milk Program, and Summer Feeding.

Department of Education : Nutrition Education ; Food Service Education ; Health Education, and Special Projects—Title IV.

Department of Mental Health : Schools for the Retarded ; Halfway Houses, and Day Treatment Centers.

Office of Consumer Affairs.

Office for Children.

Department of Agriculture: Division of Markets ; Community Gardens ; Farmers Market, and Consumer Information.

Cooperative Extension : EFNEP—Extended Food and Nutrition Education Program ; Consumer Information, and Food Service Training.

Public—Local Government services

Local Boards of Health.

Health Clinics.

Technical Services.

Private—Non-profit services

Meals on Wheels.

Food Banks.

Church Groups.

Salvation Army.

New England Dairy Council.

American Heart Association.

American Diabetes Association.

American Cancer Society.

March of Dimes.

Health Maintenance Organizations (HMO's).

Visiting Nurse Association (VNA).

Freestanding Clinics.

Private for profit services

Doctor's Offices.

Private Hospitals : Inpatient and Outpatient.

Freestanding Health Clinics.

Supermarkets.

Weight Reduction Clinics.

Health Food Stores.

Consulting Nutrition Corporations.

Education, training and research institutions

Undergraduate ; graduate ; public health ; dietetic internships, and research grants.

ENERGY

HOUSEHOLD ENERGY USE AND CONSERVATION

(By Carol B. Meeks, Housing Program Leader, Economics and Statistics Service.
Economic Development Division, U.S. Department of Agriculture)

Since 1970, the household's view of energy has changed. Not only have energy prices risen dramatically, but energy shortages have been faced at times. Households have responded to some degree. Governments at all levels have been actively involved in educating, regulating, improving technology, and instituting incentives for conservation.

This paper examines home heating fuel use, residential energy prices, and residential conservation activities. In addition use of tax incentives and building regulation are briefly examined as are Federal assistance programs for energy conservation.

This paper focuses on owner occupied detached single family housing: The dominant type of nonmetro housing. These are the highest energy users due to exterior surface areas exposed, air infiltration and internal load density—energy requirements resulting from lights, appliances, and occupants.

HOME HEATING FUELS

Home heating or cooling is the highest energy user for most households. Type of fuel used in home heating is important because it affects the ability of households to adjust to changing prices and affects initial purchase costs. Initial costs versus life cycle costs are a consideration. Developers may go for lower cost, less efficient units, often to the disadvantage of the eventual owner/resident.

TABLE 1.—PRIMARY FUELS USED IN HOME HEATING BY METRO/NONMETRO LOCATION UNITED STATES, 1970 AND 1979

Item	Metro			Nonmetro		
	Percent use 1970	Percent use 1979	Percent change 1970-79	Percent use 1970	Percent use 1979	Percent change 1970-79
Utility gas.....	61.6	60.9	-0.7	40.8	42.8	+2.0
Bottled, tank or LP gas..	2.7	2.0	-.7	13.4	12.4	-1.0
Fuel oil.....	24.9	19.9	-5.0	28.2	18.5	-9.7
Kerosene.....	(1)	.2	(1)	(1)	1.1	(1)
Electric.....	7.2	15.2	+8.0	8.7	20.3	+11.6
Coal/coke.....	2.0	.3	-1.7	4.8	.9	-3.9
Wood.....	.3	.4	.1	3.4	3.6	.2
Other.....	.5	.2	-.3	.2	.1	-.1
None.....	.7	.9	+.2	.4	.3	-.1
Total.....	99.9	100.0	-----	99.9	100.0	-----

¹ Data not available for 1970.

Source: 1979 Annual Housing Survey, preliminary tabulation.

NOTE: Special thanks to John Hession and Ron Kampe, Economic Development Division for providing background material and to James Mikesell for his helpful comments. The views expressed here are those of the author.

The distribution of fuel type varies by metro-nonmetro location. In 1979 both metro and nonmetro housing units were most likely to be heated with utility gas. However 61 percent of metro as compared with only 43 percent of nonmetro units were heated with utility gas—table 1. More nonmetro than metro units were heated with electricity, bottled gas, and other alternative fuels.

Distribution of fuels used in home heating has changed somewhat since 1970. The use of electricity has increased in both metro and non-metro locations while the use of fuel oil has declined.

Electricity was the most popular type of heating fuel used in new housing units in 1979. In nonmetropolitan areas, 61 percent of new housing was heated by electricity compared to 46 percent in metropolitan areas. Regional variations were great with 68 percent of new housing in the South using electric, 33 and 35 percent in the North Central and Northeast regions, and 46 percent in the West.

Over 25 percent of all new units in 1978 and 1979 had electric heat pumps. Prior to that time data on heat pumps were not collected. Although heat pumps may be part of the energy solution, maintenance costs may outweigh energy cost savings.

ENERGY PRICES AND EXPENDITURES

Average residential energy prices in dollars/million Btu's varied by fuel type with electricity being the most costly and natural gas the cheapest—table 2. Rural households paid lower prices per million Btu's than urban for individual fuel types.

TABLE 2.—AVERAGE ENERGY PRICES (APRIL 1978–MARCH 1979)

[Dollars per million Btu's]

Item	All	Electric	LP gas	Fuel oil or kerosene	Natural gas
Total.....	5.25	12.10	5.09	3.93	2.74
Northeast.....	5.33	15.34	7.93	3.98	3.42
North Central.....	4.57	13.64	4.55	3.82	2.57
South.....	6.81	11.75	5.16	3.94	2.85
West.....	4.27	8.28	4.18	3.77	2.30
Urban.....	5.06	12.95	5.87	3.96	2.76
Rural.....	5.85	10.50	4.91	3.88	2.60
SMSA.....	5.16	13.01	5.69	3.97	2.78
NonSMSA.....	5.46	10.71	4.79	3.86	2.64

Source: U.S. Department of Energy, "Consumption and Expenditures, April 1978 through March 1979," Washington, D.C., July 1980.

Considerable regional variation exists in average amount of energy consumed and average expenditures per household (table 3). Households in the North Central region consumed an average of 180 million Btu's from April 1978 to March 1979 with an average expenditure of \$821. Northeast households consumed an average of 166 million Btu's for an average expenditure of \$887. Households in the South consumed the least, but households in the West had the lowest average expenditures.

A comparison of data collected by the Department of Energy—DOE—with data collected by the Rural Electric Administration—

REA on average electric bills gives some indication of how rural-urban areas vary. Areas serviced by REA typically had higher average costs for all kilowatt-hour of usage (table 4). This holds true for most States. The 250 kilowatt-hour bill reflects charges for lighting, small appliance use, and cooking. Water heating usage becomes part of the larger bills. Because REA has a declining rate structure, REA households who use more than 1,000 kilowatt-hour may have lower costs than other households.

TABLE 3.—AVERAGE ENERGY CONSUMPTION AND EXPENDITURES FOR ALL FUELS PER HOUSEHOLD (APRIL 1978–MARCH 1979)

	Million Btu's	Amount
United States:	138	\$724
Northeast.....	166	887
North Central.....	180	821
South.....	99	674
West.....	110	469
Urban.....	141	716
Rural.....	128	748
SMSA.....	142	734
NonSMSA.....	129	704

Source: U.S. Department of Energy, "Consumption and Expenditures, April 1978 through March 1979," Washington, D.C., July 1980, p. 12.

Another measure of energy price increases is the Consumer Price Index—CPI. From 1970 to 1980 electricity prices increased about 127 percent, natural gas prices increased 221 percent and oil prices increased 421 percent—figure 1. These prices are important as consumers consider fuel type and equipment choices.

Conservation activities

One way of reducing the impact of energy prices is through conservation. In housing, conservation practices such as storm doors and windows and insulation have been used traditionally. In earlier periods of low cost fuels, investments in these items were less cost-beneficial than they are today.

According to the 1977 annual housing survey, owner occupied homes in nonmetro areas were somewhat more likely to have one or more storm doors or windows than were homes in metro areas. However, owner occupied homes in metro areas were slightly more likely to have attic or roof insulation.

Owner occupied homes in nonmetro areas were more likely to have received increased weather protection in 1977 than were homes in metro areas—table 5. The only exception to this was that metro homes were slightly more likely to have received weatherstripping than were nonmetro homes.

A study of 90 natural gas—NG—users and 129 liquid petroleum gas—LPG—users in rural Indiana gives us an indication of how households respond to price increases.¹ In 1971, the price of LPG was twice that of NG and in 1973–74, the price of LPG doubled whereas NG only changed slightly.

¹ Margo Rich Ogus "Residential Energy Conservation and Price Response." Unpublished research, 1980.

TABLE 4.—WEIGHTED AVERAGE BILLS FOR RESIDENTIAL SERVICE BY GEOGRAPHIC DIVISIONS AS OF JAN. 1, 1979

	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh
REA: ¹					
U.S. average.....	8.51	14.88	24.20	33.12	41.90
Geographical region:					
New England.....	9.96	17.49	28.18	38.59	50.50
Middle Atlantic.....	9.84	16.28	25.55	34.38	43.07
East North-Central.....	9.48	16.45	26.85	36.72	46.38
West North-Central.....	9.38	16.13	25.47	34.13	42.70
South Atlantic.....	8.76	15.45	25.32	34.73	43.84
East South-Central.....	6.79	12.21	20.56	29.03	37.58
West South-Central.....	8.42	14.76	24.07	33.00	41.72
Mountain.....	8.63	14.54	22.59	30.20	37.58
Pacific.....	6.33	9.45	13.25	16.81	20.43
Noncontiguous.....	10.51	21.57	37.12	51.46	64.14
Typical electric bills (communities over 2,500 in population): ²					
U.S. average.....	7.10	13.86	23.05	32.72	43.12
Geographical region:					
New England.....	8.00	15.75	24.55	34.54	45.32
Middle Atlantic.....	9.04	18.12	29.89	41.14	54.88
East North-Central.....	6.81	13.68	22.19	31.90	42.14
West North-Central.....	6.31	13.01	21.82	31.22	40.74
South Atlantic.....	7.40	13.38	22.43	31.21	40.38
East South-Central.....	5.55	10.38	17.62	25.51	33.39
West South-Central.....	6.96	12.52	19.93	27.84	35.89
Mountain.....	6.95	13.41	21.93	30.50	39.60
Pacific.....	5.15	10.27	19.29	29.45	39.60
Noncontiguous.....	9.51	17.85	29.57	41.29	53.27

¹ U.S. Department of Agriculture, Rural Electric Administration, "1979 Annual Statistical Report," June 1980.

² U.S. Department of Energy, "Typical Electric Bills, Jan. 1, 1979," Washington, D.C., October 1979.

LPG households increased their fuel-use efficiency in 1973-74 and maintained and improved the increase in the following years. NG users only made slight changes. LPG users had more insulation than NG users. LPG users own the same set of appliances as NG users but have more electric appliances.

Compared to NG households the LPG households more often adopted and maintained energy conservation activities such as closing off a room, turning down the thermostat and turning down the thermostat more. Structural changes such as attic and wall insulation, adding storm doors or windows, caulking, and weatherstripping were reported by more LPG households than NG households. The study concludes that a substantial economic incentive is required to create a significant and sustained energy conservation response.

One of the major issues of the eighties will be indoor air quality. As more houses are constructed or retrofitted so that less energy is consumed, infiltration is decreased. This has led to major concerns over quality of air and potential health hazards.

Figure 1. Consumer Price Index 1970-1980 Oil, Gas, and Electricity, 1967=100.

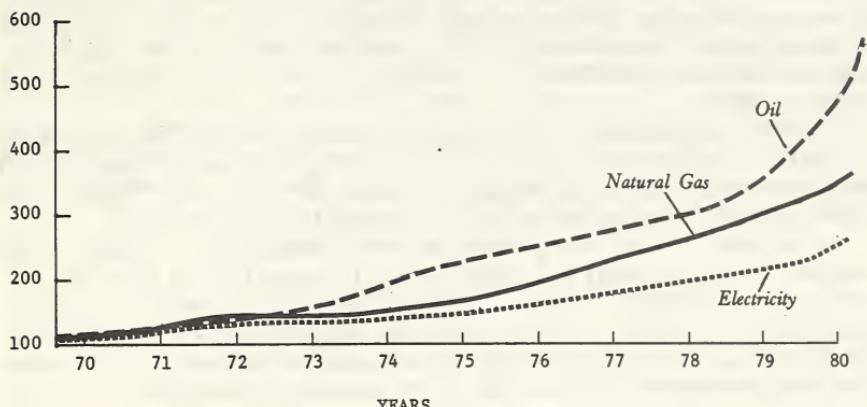


TABLE 5.—OWNER OCCUPIED HOMES RECEIVING INCREASED WEATHER PROTECTION IN 1977

	Metro	Nonmetro
Storm windows.....	14.6	19.1
Storm doors.....	11.1	11.4
Attic insulation.....	12.5	13.4
Wall insulation.....	5.9	7.8
Weatherstripping.....	24.1	22.1

Source: 1977 Annual Housing Survey.

Little data exists that will help establish policy. Canada and Sweden have air quality standards that are being studied. HUD has recently requested comment on ventilation in housing units that are covered by its minimum property standards. HUD noted that a proliferation of codes and standards has resulted in conflicting criteria regarding natural and mechanical ventilation. Some States are establishing air quality standards for formaldehyde levels in housing units. One of the problems is the ability to accurately measure formaldehyde concentrations.

In the future new housing units may have more consideration given to the energy needed for heating and cooling. However today larger units dominate. Over 50 percent of all new 1979 U.S. housing units had 1,600 square feet or more floor area. Little regional variation existed. However housing units with 1,600 or more square feet only accounted for 41 percent of new nonmetropolitan units but 60 percent of new metropolitan units.

Although often criticized as a source of heat loss, fireplaces have increased in popularity with 67 percent of all new households having one or more in 1979. New housing units in the West and South were more likely to have fireplaces than those in the Northeast or North Central regions. New nonmetropolitan houses were less likely to have a fireplace than were metro homes. Since the more temperate regions had more fireplaces, one might postulate that they are not meant for heating and are luxury items—thus there are fewer in nonmetro homes.

Much of the efforts of private industry and Federal policy have concentrated on improving energy savings of the housing structure. However attention is increasingly being focused on the mechanical systems and equipment within the structure. For example, California has established guidelines for air-conditioners that go into effect in October 1981.

However, expansion in the use of home appliances has somewhat increased energy use. From 1970 to 1979, the number of homes with room air-conditioners, dishwashers, clothes dryers, home freezers and color television sets increased by 60 percent or more—table 6.

In the last 5 years, the percent of new single-family housing units completed with central air-conditioning increased from 46 to 60 percent with 85 percent of all new housing units in the South having air-conditioning in 1979, whereas only 26 percent of new units in the Northeast had air-conditioning. New nonmetro housing units are less likely to have central air-conditioning than are metro units.

TAX CREDITS

Another way to induce conservation is to allow for tax credits or deductions. The Federal personal income tax credit permits 15 percent of the first \$2,000 expended on qualified items to be deducted for taxes. Results of a recently completed survey of expenditures for conservation and renewable resource measures that were reported on 1978 individual tax returns—1040 forms—gives an interesting reading on residential conservation activities. Tax credit expenditures were reported on 5.9 million returns. This represents 6.6 percent of the total number of 1978 individual tax returns.

TABLE 6.—APPLIANCE USAGE IN HOMES, UNITED STATES, 1970 AND 1979

Item	1970 (millions)	1979 (millions)	Percent increase
Room air-conditioners.....	26.0	44.1	69.6
Dishwashers.....	17.0	34.2	101.2
Clothes dryers (electric and gas).....	28.6	48.8	70.6
Electric ranges.....	35.5	55.2	55.5
Home freezers.....	20.0	35.5	77.5
Refrigerators.....	68.9	79.2	15.0
Color TV.....	27.2	71.3	62.1
Washers.....	39.8	61.4	54.2

Source: U.S. Department of Energy, Energy Information Administration, "Annual Report to Congress, 1979," vol. 2, table no. 75 "Number and Percent of Wired Homes with Major Electrical Appliances, Selected Years—1960 through 1979," p. 179, (Gralla Publications, New York, N.Y., Merchandising, Annual Statistical Issues).

A total of \$4.2 billion or an average of \$708 per return was reported to IRS as expended for these purposes. This amount was for the following purposes:

Purpose of expenditure	Amount (thousands)	Percent
Conservation, total.....	\$4,090,096	97.3
Insulation.....	(1,758,727)	(41.8)
Storm windows and doors.....	(1,790,437)	(42.6)
Other.....	(540,932)	(12.9)
Renewables.....	115,540	2.7
Total.....	4,205,636	100.0

The Northeast, North Central and West Central portions of the country had, in general, the greatest amount of conservation activity. The least amount of activity occurred in the South and West.

The low usage of tax credits could indicate that a 15-percent credit is not a large enough incentive. Many lower-income households may not have the capital available to make investments in energy-saving items. In addition, the long tax form must be completed to claim the deduction. Since the law was passed in 1978, retroactive to 1977, 1978 tax returns may not be the best indicator of the role of tax credits. Greater use of the tax credits may have taken place in more recent years for which data are not yet available.

BUILDING ENERGY PERFORMANCE STANDARDS (BEPS)

Prices and tax credits are incentives for conservation. Regulation is another type of incentive. Building Energy Performance Standards—BEPS—were mandated by Congress to achieve energy efficiency in buildings. Although BEPS covers all buildings, I am only going to discuss implications for residential buildings. Through BEPS, the reduction in energy consumed is expected to be above that created by market forces alone.

DOE has responsibility for the development and promulgation of standards for new buildings, which are to be implemented at the State and local level through building codes. Because of a lack of data and negative reactions to the proposed standards for housing units, a set of interim standards that are applicable only to direct Federal construction will be published by August 1981 with final standards and a report to Congress expected by April 1983. The standards will contain design energy budgets which tell a builder how many Btu's per square foot a building can use. The standards apply to building design, not operation or maintenance.

Some of the issues which DOE will examine are different administrative structures, local laws, reactions from builder, consumers, and code officials. Of major concern is the equivalency between local and State regulations and the DOE regulations. Questions raised by the proposed standards include:

1. The cost increase of housing to purchaser versus benefits. (The National Association of Home Builders estimated a minimum price increase of \$3,000.)
2. The need for more differentiation by region.
3. A penalty is imposed on the small house or manufactured house.
4. A sound research base is needed to support standards and a cost-benefit analysis.
5. Additional redtape added to the already high cost of housing.
6. Liability questions.

The final standards will have a major impact on housing construction. Much time, attention, and dollars will be invested in their development in the next couple of years.

FEDERAL PROGRAMS

Federal assistance is available for weatherization, conservation, and financial assistance for qualified individuals, agencies, or communities. Some of those available to rural residents will be briefly highlighted here.

FmHA under their 504 program can make loan or grants for repairs and improvement which includes installation of storm doors and windows, siding, and insulation. In 1980, over \$21 million was given in loans and \$24 million in grants.

REA will provide loans for studies of renewable energy resources and may delay principal payments for members with energy conservation programs. REA also allows relending of funds to members for weatherization on the assumption that this accomplishes the national purposes of energy conservation and conservation of natural and capital resources.

A secondary mortgage market for home improvement loans is now beginning. This will allow lenders to turn over funds invested in major energy improvement activities. The future will see the programs which have just started or are being discussed playing a major role in energy conservation.

Through the Department of Health and Human Services, States may receive funds to pay for up to 2 percent of State-established fuel assistance programs for residential energy costs.

The Federal Residential Conservation Service program requires that by March 1981, large gas and electric companies offer energy audits to all residential customers. The utilities must also help customers arrange financing and installation of recommended energy measures.

THE FUTURE

There are no indications that concern over energy will decrease in the near future. Consumers will need to continue to improve the energy efficiency of their houses and the equipment they purchase. They will look more closely at life cycle costs rather than initial costs. In some areas, choice may be constrained by fuels available.

Builders and manufacturers will continue to improve energy efficiency of housing units and equipment. Government regulations will push these changes and energy prices will pull them through changing consumer demands.

The Federal Government will continue in a variety of ways to improve conservation. Activities will not only include regulation but assistance to individuals, local governments, and States. The Energy Conservation and Solar Bank will have a greater role in the future.

Utility companies may finance energy conservation improvements, spurred on by State and Federal legislation.

Assessment of ongoing efforts and coordination of programs and organizations will receive increased attention as involvement in energy conservation increases.

THE 1978 NATIONAL INTERIM ENERGY CONSUMPTION SURVEY

(By Wendel Thompson, U.S. Department of Energy)

Most of the statistics on energy that have been collected by the Government in the past were statistics on the supply and production of energy. Times have changed, and this change has brought with it requirements for new information. During these times of increasing prices and uncertainties of supply, management of energy resources requires information about how the energy is used by the final consumer. The Office of the Consumption Data System, Energy Information Administration, in the U.S. Department of Energy, is developing procedures for collecting data on how energy is being used in the residential, commercial, transportation, and industrial sectors of the economy. This report describes the surveys of residential energy consumption, what data are presently available, and the plans for future surveys.

In designing a data collection effort for the residential sector, top priority was given to satisfying a multitude of interests which grew out of this country's increasing concern with energy in general. A partial list of these interests include:

- the burden of energy costs on the low-income, minorities, and the elderly;
- the changing housing stock and use of fuels as they affect forecasts of future energy use;
- the influence of rising energy costs on consumption and conservation activities;
- the use of automobiles and changes in the fuel efficiency of automobiles;
- the potential for solar applications;
- energy use in apartments where households have less direct control over energy use;
- energy standards for new houses; and,
- the usefulness of tax credits to promote conservation.

The residential sector consumes about one-fifth of the energy used by consumers¹ and thus merits special attention. To satisfy the many interests about what was happening in this sector, we needed a data set which could be analyzed in multiple ways to serve these multiple interests. In addition, we wanted hard data on energy consumption that would support important decisions that needed to be made. The result was a design to collect data about individual households and to collect billing records from the household's fuel suppliers.

¹ Residential consumption does not include gasoline used for household vehicles. Consumers also include all end users of energy in industry, business, and transportation.

THE NATIONAL INTERIM ENERGY CONSUMPTION SURVEY (NIECS)

The first survey undertaken by the Office of the Consumption Data System was called "interim" because some planned features of the Residential Energy Consumption Surveys (RECS) were not yet in place when data were collected from households in October and November of 1978. The NIECS was a national probability sample of 4,081 successfully completed household interviews. The number of completed interviews represented a response rate of 90.5 percent of all eligible housing units and was achieved through a multiwave, multi-contact attempt to reach households culminating in using the mail to reach the last 5.3 percent. A \$2 incentive was given to each household to encourage cooperation throughout the whole interview. Near the end of each interview, the household was asked to sign an authorization that would permit fuel suppliers to provide the household's fuel records for a 15-month period. Most households signed the authorization.

The 44-minute interview covered: Structural features of the house related to energy such as size, insulation, and openings; the heating and cooling systems; fuels used and what they were used for; energy conservation efforts; household appliances and vehicles; and, demographic data on the household.

Response Analysis Corp., Princeton, N.J., conducted the fieldwork including the followup surveys and played an important role in designing the survey.

Contacting the fuel suppliers was the next step in data collection and the most important one for it is the actual fuel consumption records for the household that give this data collection its uniqueness. All electric and gas utilities cooperated and data were ultimately received for 89 percent of the electrical bills paid directly to the company by the household and for 85 percent of the natural gas bills. Data were collected by mail following initial contacts by telephone or in person. The most frequent reason for not getting a utility bill was either an unsigned authorization or failure to match the authorization with a utility company record. Contacts were less successful for the other fuels resulting in receipt of records for 64 percent of the fuel oil/kerosene bills and 64 percent of the liquefied petroleum gas (LPG) bills. Contacts with these fuel suppliers typically involved requests for one or two households. The companies were small in comparison to electricity and natural gas utilities and required different data collecting procedures. With these fuel dealers data were collected over the telephone after the supplier had received the signed authorizations.

Additional followup efforts were directed to collecting more accurate data in situations where the household lacks the information, where specially trained interviewers were required, or maintenance of records was needed in the absence of existing records. In large apartment buildings renters may not know what fuels are used to heat the building because the fuel bills are hidden costs in their rent. In these cases an interviewer contacted the rental agent for additional information that was later incorporated into the data set resulting in more accurate information about rental units.

Another followup effort in NIECS was to send a trained technician to 44 households to make measurements and observations of such items as the square footage of living space, temperatures of the hot and cold water, insulation in the walls and attic, and siting of the house. Data from these households will be extremely useful for methodological analyses and improving our data-gathering procedures.

Since the summer of 1979 when shortages of fuel oil seemed imminent, we have continued to check with households using fuel oil—or kerosene. Our interest has centered on the continued use of fuel oil, household inventories and deliveries, and conservation activities.

The most extensive of these followup surveys is the household transportation panel. In order to complete the picture of residential energy consumption, we must include the use of gasoline for household vehicles which, in quantity, approaches the consumption of fuels inside the home.

Household transportation panel.—A subsample of NIECS households that have vehicles available for the personal use of household members² is brought into the transportation panel each month. Households report on their fuel purchases, odometer readings, and fuel gage readings for 2 months. Four months later they are returned to the panel for another 2 months of reporting. Diaries are mailed to households and in most cases the information is collected over the telephone within a few days after the end of the month. This design will yield annual estimates of miles driven, gallons of fuel purchased and consumed, and the efficiency of the vehicle fleet (miles per gallon). Since all vehicles in the household are included, the analysis can focus on the tradeoffs between vehicles in the same household. In addition these data will be used to chart the changing efficiencies of the vehicle fleet, the use of leaded fuels in vehicles designed for unleaded fuels, and the reaction of drivers to the increasing prices of gasoline.

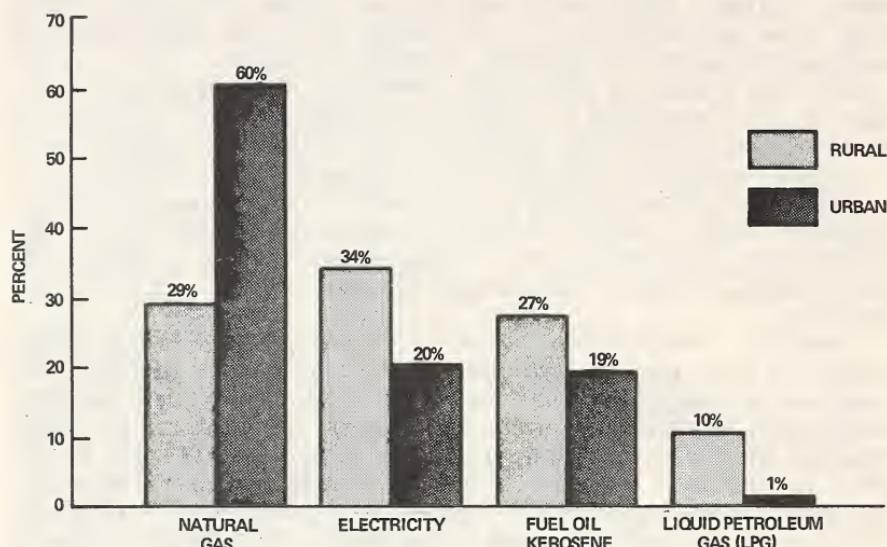
SOME SURVEY RESULTS

Before discussing a few findings that I think would be of interest to agricultural conferees, let me pose this question: How will rural households react to future increases in the price of energy? These increases are projected to be the largest for petroleum derived fuels—fuel oil, kerosene, and liquified petroleum gas—LPG. Natural gas prices are expected to increase but not as much as petroleum fuels. Increases will be the smallest for electricity.³ One way to view the impact these increasing prices will have on rural households is to look at how much the rural household is dependent on these types of fuels. Figure 1 below shows that rural households rely on petroleum fuels more than do urban households. Rural households get 27 percent of their energy from fuel oil (including kerosene) and 10 percent from LPG for a total of 37 percent from petroleum derivatives. By comparison, only 20 percent of the urban household energy consumption comes from these petroleum fuels.

² This would include company cars and cars not owned by the household.

³ Energy Information Administration, "Annual Report to Congress, 1979. Volume III: Projections," (DOE/EIA—0173(79)/3), p. 194.

FIGURE 1. PERCENTAGE OF ENERGY (IN BTU'S) FROM NATURAL GAS, ELECTRICITY, FUEL OIL, AND LPG CONSUMED BY RURAL AND URBAN HOUSEHOLDS



NOTE: DATA REPRESENTS APRIL 1978 THROUGH MARCH 1979.
ELECTRICITY CONVERSION RATE IS 3,412 BTU'S PER KILOWATTHOUR.

SOURCE: 1978 NATIONAL INTERIM ENERGY CONSUMPTION SURVEY,
OFFICE OF THE CONSUMPTION DATA SYSTEM, ASSISTANT
ADMINISTRATOR FOR PROGRAM DEVELOPMENT, ENERGY
INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF
ENERGY.

Will rural households replace their household energy-using equipment with more efficient models, and will they change to other fuels and improve the levels of insulation in their homes? A more thorough analysis of the data might provide some answers to these types of questions. Our continuing surveys with return interviews at the same households will provide additional information on how rural households will cope with this aspect of the energy problem.

Another way of looking at rural consumption is to ask whether the average rural household consumes more or less energy than its urban counterpart. Although the difference is quite small, the typical rural household uses less energy than a typical urban household. The figures are:

Annual consumption per household:

Million Btu

Rural	128
Urban	141
All households	138

The difference roughly represents the average annual electrical use of two frostless refrigerators, not a large amount of energy but small differences accumulated over a large number of households can reach significant size. Why it is that the rural household uses less energy is not certain from this brief glimpse into the data. Rural households tend to concentrate somewhat more in the South and West but a better explanation is likely to be found in the demands on

energy-using equipment found in rural households and the demographic makeup of the household.

Although the typical rural household uses less energy than the urban household, both households paid about the same for the energy they used. This result is probably due to the greater use of electricity by rural households. Electricity is a higher priced fuel by a factor of two or three times. The average energy prices for the four fuels is listed below:

	Paid per million Btu
Electricity	\$12.10
LPG	5.09
Fuel oil/kerosene	3.93
Natural gas	2.74
All fuels (sales weighted average)	5.25

There may be more meaningful ways to separate households than by the rural-urban split than I have chosen for this paper. The differences between regions, between income groups, and between types of housing structures are larger than the rural-urban difference. The typical household in the South pays more for energy than one in the West, although their energy usage is about the same. Compared with the South and West, the Northeast and North Central households pay more for energy but they also use more.

ANNUAL CONSUMPTION PER HOUSEHOLD

	Million Btu	Amount
North-Central	180	\$821
Northeast	166	887
West	110	469
South	99	674
All households	138	724

Data from the first months of the transportation panel, beginning in June 1979, are now becoming available. During the summer of 1979 some parts of the country experienced shortages of gasoline. How much these shortages and changed driving habits are reflected in these results will be clearer as more data become available. As for differences in the use of vehicles between rural and urban households in the summer of 1979, some evidence suggests that the typical rural vehicle was driven more miles than the typical urban vehicle, perhaps 10 percent or more. However, the efficiency of the rural vehicle—miles per gallon—seemed to be no different from the urban vehicle.

FUTURE PLANS

We plan to continue conducting annual household surveys very similar to the NIECS. Residential energy consumption surveys—RECS—as the surveys are now called, will have the following features that will distinguish them from NIECS:

Increased coverage of housing units to include those in Alaska, Hawaii, and those on military bases.

Some at the same households will be interviewed 2 years later to provide better information on changes in important energy statistics.

Improved measurement of important data elements including measurement of the actual square footage of living space. Interviewers will make the measurement using a measuring tape.

Improved methods of estimating fuel consumption for rental apartments.

Information about the consumption of wood for home heating.

Use of a specially designed sample of 131 primary sampling locations selected, in part, on the basis of the dominant heating fuel and sampled to produce reliable estimates for 10 Federal regions or 9 census regions when two surveys are combined together.

Sample size increased to 5,000.

An additional sample of 500 households to be used for special methodological studies.

One of the most important future activities is to develop methods for breaking down the fuel records into the most important component end uses which are space heating, space cooling, and water heating. Once this is done we shall be able to attach a measure of efficiency to some of these household energy activities. Combining the actual square footage measurement with weather data for the individual household, we can derive a figure for the consumption of Btu per square foot per heating degree day.⁴ This measure will give us a figure engineers use in evaluating building designs and operations. We can then chart the changing efficiencies over time, relate these efficiencies to housing and demographic characteristics, and provide data on the relative payoffs of improving the efficiency of household energy use.

Other plans for the future are more long range but not any less important. We are anxious to fulfill our original intentions of having a data set which combines all household consumption and, of course, for the same annual or calendar year period. The time for this will come after we have collected several years of utility bills for the household. These bills will cover the same time period as the reports of gasoline purchases maintained by the household for the transportation panel.

PUBLIC AVAILABILITY OF NIECS DATA

The following reports can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Residential Energy Consumption Survey: Conservation, February 1980, DOE/EIA-0207/3, GPO No. 061-003-00087-8, \$6.

Residential Energy Consumption Survey: Characteristics of the Housing Stock and Households, 1978, February 1980, DOE/EIA-0207/2, GPO No. 061-003-00093-2, \$4.25.

Single Family Households: Fuel Inventories and Expenditures: National Interim Energy Consumption Survey, December 1979, DOE/EIA-0207/1, GPO No. 061-003-00075-4, \$1.75.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1978 through March 1979, July 1980, DOE/EIA-0207/5, GPO No. 061-003-00031-9, \$6.50.

A report entitled "Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, June-August 1979" (DOE/EIA-0207/4) will soon be available.

One who wishes to work with the individual household records can acquire the data set on computer tape from the National Technical Information Services. Contact Stu Wiseman at (703) 487-4808 for details.

⁴ Measure of how far the daily average temperature falls below 65°.

ENERGY AVAILABILITIES FOR AGRICULTURE

(By Ronald L. Meekhof, Economics and Statistics Service, U.S. Department of Agriculture

Within the past 2 years world energy markets and economic activity have seemingly gone through a process of continuous adjustments to unforeseen and unprecedented petroleum price increases and supply interruptions. Export availability of oil was reduced by 4 million barrels per day due to events in Iran. Within the past 2 years the international price of oil has again more than doubled. These events have lead many importers of petroleum products, including the United States, to search out alternative supplies, redouble efforts to expand domestic production, and conserve. International oil price and supply conditions will continue to cause economic adjustments and shape policy responses that will have a growing importance for the farm sector.

In the following few moments I will briefly review the U.S. energy situation for 1980, discuss changes in farm energy consumption patterns in 1980, make some projections for 1981, and discuss the implications for the farm sector.

PETROLEUM SITUATION

Consumption

Total petroleum consumption in 1980 was 17.3 million barrels per day or 6.3 percent below petroleum consumption in 1979. This decrease is the result of higher prices, reduced economic activity and a mild winter. Motor gasoline use, in 1980 will down by 6.1 percent following a drop of 5.2 percent in 1979. The decreases in gasoline use were due to higher prices, lower real incomes, and conservation from increased vehicle efficiency. Because of a moderate winter in most regions of the United States in 1980 and higher prices, distillate fuel use in the first quarter of 1980 declined 18 percent below that for the first quarter of 1979. For 1980 in total, distillate consumption will fall by about 8 percent. Natural gas consumption is projected to increase by 2.5 percent in 1980. Gross energy consumed from all sources in 1980 will probably fall by 1.8 percent from that in 1979.

Supply

On the supply side, world production of crude oil is down slightly from 1979 levels, due mostly to a drop in Arab OPEC and Iranian production. This decrease is tempered somewhat by production increases in the United States, Mexico, U.S.S.R., and Canada. Overall crude oil production is down by just under 4 percent.

Domestic.—1980 domestic crude oil production is not expected to change significantly from 1979 levels. Increases in Alaskan production will more than offset slight declines in continental production levels.

Imports.—The most significant change in the energy picture in 1980 is a projected decrease in net petroleum imports from 7.9 to 6.5 million barrels per day. This 18-percent decrease is a departure from a historical upward trend. In the first quarter of 1980, imports of crude and refined product average 7.9 million barrels per day. In recent weeks, we have seen imports fall below 6 million barrels per day. Petroleum imports from OPEC which were 67 percent of direct petroleum imports fell by 18.5 percent in the first half of 1980 due primarily to reduced shipments from Iran and Venezuela. The decline in oil imports from OPEC amounted to about 1 million barrels per day.

Stocks.—Between October 1979 and October 1980, total stocks of crude oil and petroleum products rose by 10.9 percent or 143 million barrels. It is noteworthy that stocks remained high despite declining imports. Total stocks of petroleum are projected to remain higher than year earlier levels through the end of 1980, and significantly higher than projected normal stock ranges.

Motor gasoline stocks in late October were about 15.6 percent higher than year earlier levels. The contribution of reduced consumption and recession to this level should moderate gasoline prices in the near future. Distillate fuel stocks at 227 million barrels are essentially unchanged from October 1979 and are at a normal level for this point in the heating season.

Prices

At the beginning of the third quarter of 1980, OPEC's official crude oil price was raised to \$32 per barrel. This contrasts with \$18 per barrel in 1979. Saudi Arabia however, has been reluctant to raise its price to official levels while most other petroleum exporting countries have incorporated the increase. Recently, there has been some downward pressure on prices as a result of reduced demand and large inventories held by consuming countries.

Gasoline prices rose substantially in 1980, from a national average of \$0.87 per gallon to a projected \$1.25 per gallon, a 44-percent increase. Retail prices for heating oil rose from \$0.71 cents per gallon in 1979 to a projected national average of \$1.02 per gallon. Natural gas prices increased from an average of \$3.23 per 1,000 cubic feet to a projected \$3.73 in 1980.

THE RESPONSE IN THE FARM SECTOR

In response to the changes in energy prices between 1979 and 1980 and other factors, small changes occurred in energy consumption in the farm sector. In 1980, diesel use in the farm sector fell by 4.5 percent. Given the trend toward increased use of diesel power in farm production, an increase in acreage planted and increased production of energy intensive crops this appears to be significant reduction in use and reflects increased efficiency in production and changes in cultural practices.

Diesel use in crop production fell by 3.8 percent. While, diesel use in livestock production, a relatively small share of total agricultural diesel use, fell by 8 percent.

Motor gasoline use in the farm sector, which accounted for slightly more than half of combined motor fuel use in 1980, increased about 2 percent.

THE PETROLEUM OUTLOOK FOR 1981

Consumption

The rate of decline in total domestic petroleum use is expected to moderate in 1981 because of a rebound in economic growth and a leveling of real fuel prices. By the second quarter of 1981, petroleum use is expected to reach year earlier levels of slightly more than 16 million barrels per day. Motor gasoline consumption by the third quarter of 1981 is projected to be in the range of 6.2 to 6.4 million barrels per day which is slightly less than current levels. Distillate fuel consumption will increase in the first half of 1981 by 8 percent over year earlier levels due to a resumption of normal weather patterns and a relatively small increase in prices. Natural gas consumption is expected to increase slightly less than 2 percent through the first three quarters of 1981 in comparison to 1980 levels.

Production

The total production of domestic liquid hydrocarbons in the first three quarters of 1981 is projected to increase only slightly above production in the first three quarters of 1980. Motor gasoline production through the first three quarters of 1981 will be down by about 1 percent, matching the decline in consumption. Distillate fuel supplies are projected to increase by about 7 percent in the first three quarters of 1981, a rate slightly lower than the rate of increase in consumption. Natural gas production is expected to continue the modest rate of increase shown by increasing slightly less than 2 percent.

Imports

Imports of crude oil in 1981, after declining in 1980 are projected to decrease very slightly in 1981. Imports for the first three quarters of 1981 will be lower than year earlier levels but are likely to reach about 6.4 million barrels per day by the third quarter. Continued cutoffs of Iranian and Iraqi oil may lower imports somewhat. Currently, Saudi Arabia is making up a portion of the shortfall and would hopefully continue. The impact on oil imports will probably be felt in higher prices rather than through reduced availabilities.

Stocks

Some decline in petroleum inventories is projected for the first half of 1981 as total consumption declines only slightly through this period. The level of inventories will still be above normal levels relative to projected consumption.

Gasoline stocks are projected to decline in the first three quarters of 1981 by less than 1 percent from the same period in 1980. On the other hand, stocks of distillate fuel oil are projected to decline 12 percent over a similar period as consumption increases. The most notable decreases are in the first two quarters of 1981 after which stocks are projected to rebuild. Crude oil, motor gasoline, and distillate fuel oil stocks are all projected to be at or above projected normal stock ranges.

Prices

World spot market prices from crude oil have recently shown significant gains largely due to the Iran-Iraq war after some softening in the third quarter of 1980. Whether the upward trend will continue is uncertain given the large world stocks of crude oil and declining

consumption. Further uncertainty in the world crude oil price picture is added by the upcoming December OPEC meeting. The average price paid by domestic refiners, currently about \$28 per barrel is expected to increase by about \$6 per barrel by the third quarter of 1981 even if world oil prices are constant, due to decontrol of domestic crude oil prices. If world oil prices increase by \$3 to \$4 per barrel, a more likely scenario. U.S. refiners costs for crude oil are projected to rise to about \$38 per barrel. Petroleum product prices are expected to increase through 1981 but at a slower rate than in the past year. Prices for motor gasoline are projected to increase by about 20 to 25 percent on average for the first three quarters of 1981 over the annual 1980 price level. Gasoline prices are likely to fall in the range of \$1.40 to \$1.80 by the third quarter of 1980. But there are several factors that could lead to a much different price level for gasoline.

Distillate fuel prices will also increase but at a somewhat slower rate. Increases of 15 to 20 percent are projected with a range of \$1.14 to \$1.42 by the third quarter of 1981. The slower rate of increase is a result of the dollar for dollar changes that occur between crude oil and distillate fuel prices whereas gasoline prices are further affected by the "tilt" regulations.

Natural gas prices are projected to be in the range of \$4.04 to \$4.46 per 1,000 cubic feet by the third quarter of 1981, although a price of \$4.25 per 1,000 cubic feet is most likely. This would represent and increase of about 14 percent above the average natural gas price in 1980.

International considerations

A note of caution should be added to these projections. The recent developments in the Middle East, if they continue to escalate, could seriously affect world oil markets. It is estimated that the war between Iran and Iraq will remove between 3 and 3.8 million barrels of oil per day from the world market. The economic impact of this reduction could be relatively minor. But if all exports from the Persian Gulf region were cut off, severe shortages would appear. Approximately 28 percent of all oil trade in the world market passes through the Strait of Hormuz.

As a result of the elimination of supplies from Iran and Iraq with no corresponding increase in oil supplies from other sources, world oil prices could increase by 43 percent reaching \$46 per barrel. If the entire Persian Gulf oil supply was cut off, crude oil prices could more than double to a minimum of \$75 per barrel.

Summary

Farmers again will face significant increases in the cost of energy. Decontrol of energy prices, the price of foreign imports and other factors will cause prices paid for fuel and energy in 1981 to increase by about 20 percent above those found in 1980. This rate of increase exceeds those for most other production expenses and is a significant increase in real terms. Farmers will have to consider the types of substitutions that can be made between fuel and energy inputs and other production inputs. For producers of energy and fuel intensive crops, such as corn and cotton, these substitutions will be more important. Whether or not the farmer will alter his production strategy in 1981 in response to relatively high petroleum prices will be further influenced by relative crop prices.

While prices will be significantly higher, farmers can expect supplies of major petroleum fuels to be readily available. National stock levels of crude, oil, gasoline, and diesel fuel are at significantly higher than normal levels. Regional shortages of the nature that occurred in 1979 and early 1980 should be greatly reduced in 1981.

The highly seasonal needs of the agriculture production sector and the inability to recover from the lack of fuel at critical planting periods point to the need for agriculture to maintain its current priority if the need for a national allocation or rationing program arises. The farm sector is producing at full capacity. If fuel supplies are not available, the ability to meet continuously growing export demand, projected needs of the livestock sector and other domestic food needs, the need to rebuild stocks, and growth in demand for agricultural feedstocks for use in alcohol production in 1981 could be jeopardized. Reduced output given growing demand in these areas, would be reflected in commodity prices and the ability to meet agricultural policy objectives for maintaining stable prices at reasonable levels, maintaining export availability and international food security, and contributing to alcohol fuel production.



